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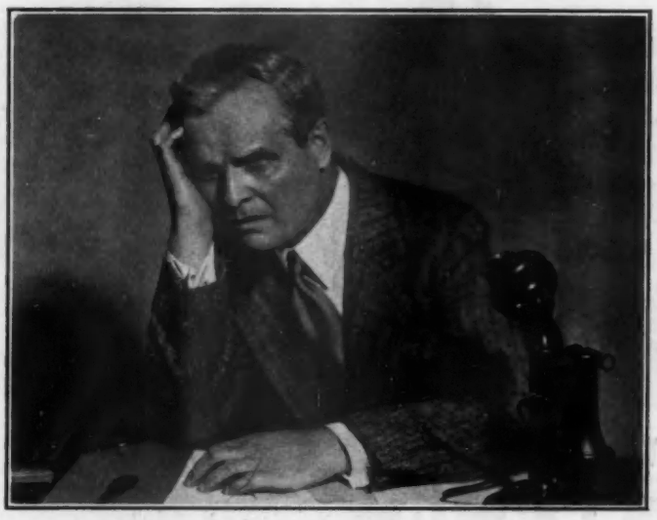

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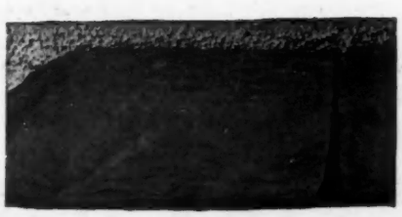

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THE OIL WEEKLY

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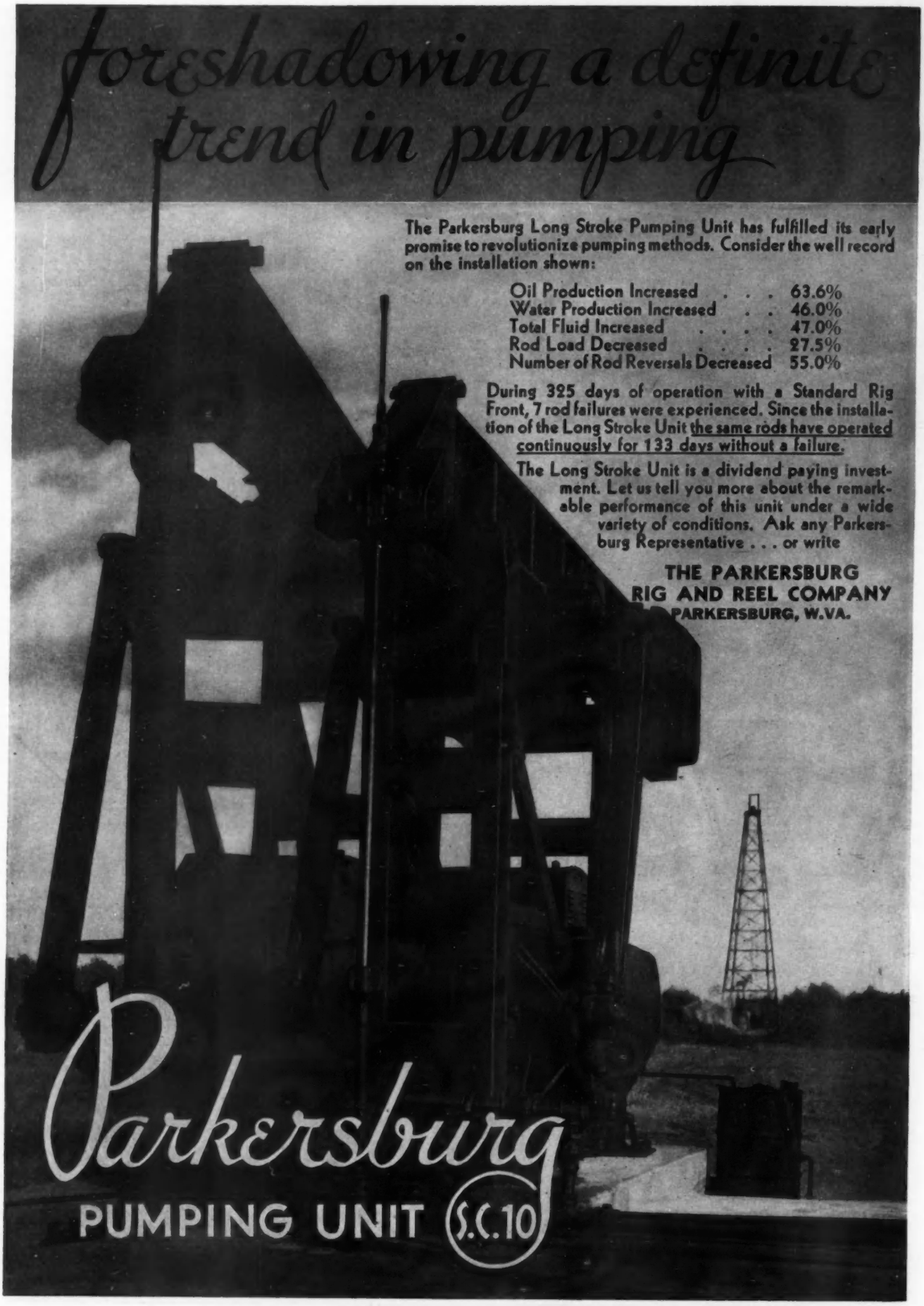
foreshadowing a definite trend in pumping



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VOLUME 77, No. 10 MAY 20, 1935

THE OIL WEEKLY

FOR OIL AND GAS PRODUCTION AND
PIPE LINE DIVISIONS

ENGINEERING • NEWS • STATISTICS

The Changing Panorama

Safety Progress

DECLINES of 17 percent in the frequency of fatal injuries and of 11 percent in the severity of injuries gave the petroleum industry in 1934 one of the best accident prevention records to date, according to the final report for the year made by H. N. Blakeslee, director of the American Petroleum Institute's Department of Accident Prevention.

Adjustment of forces, addition of men, and problems of supervision under NRA working schedules led to an increase of 10 percent in frequency of injuries, but the industry's frequency rate of 14.31 injuries per 1,000,000 hours worked was less than the 1933 all-industry frequency rate of 14.56 and probably less than the 1934 all-industry rate, data for which are not yet available. The National Safety Council has forecast a large increase in the all-industry rate.

It is expected that the petroleum industry's accident severity rate, 1.69 days lost for each 1000 hours worked, also will be below the all-industry 1934 rate.

Director Blakeslee's records show that between 1927 and 1934 the petroleum industry, through practical accident-prevention measures, has reduced its accident frequency rate from 31.15 injuries per 1,000,000 hours worked to 14.31 injuries. In the same period the accident severity rate has been cut from 2.65 days lost per 1000 hours worked to 1.69. During 1934 there was one lost-time injury to each 28 workers, as compared with one injury to each 11 workers in 1927. The number of fatalities was only one to each 2374 workers in 1934, as against one to each 1476 workers in 1927.

The records further show that the petroleum industry has become one of the safest of the larger industrial undertakings.

Dictatorship

BUSINESS good will is an asset, and as such is property or, as Shakespeare has it, more than property—"who steals my purse steals trash." When a governmental agency, then, seeks to tarnish the reputation of its citizens without the most exacting judicial procedure, it violates two of the fundamentals—the much aired "due process" and also that earlier provision that no unusual punishment shall be inflicted. The immedi-

The Oil Man's Calendar

MAY

20-21 *National Oil Scouts Association, Corpus Christi, Texas.*

20-23 *National Association of Purchasing Agents—Oil Buyers' Group Session, Waldorf Astoria Hotel, New York.*

JUNE

5-6 *Eastern District, A.P.I. Division of Production, Pittsburgh, Pennsylvania.*

6-7 *National Petroleum Association, Fire and Safety Marshals, Oil City, Pennsylvania.*

19-21 *American Society of Chemical Engineers, Cincinnati, Ohio.*

20-21 *Pennsylvania Grade Crude Oil Association, State College, Pennsylvania.*
American Society for Testing Materials, Detroit, Michigan.

AUGUST

American Petroleum Equipment Suppliers Association.

19-24 *American Chemical Society, San Francisco, California.*

SEPTEMBER

25-27 *National Petroleum Association, Atlantic City, New Jersey.*

NOVEMBER

4-5 *Independent Petroleum Association of America, Annual Meeting, Dallas, Texas.*

11-14 *American Petroleum Institute, Annual Meeting, Biltmore Hotel, Los Angeles.*

ate case at point is Mr. Ickes' procedure against two oil companies which have been barred from participation in supplying governmental departments with products because they did not agree with the Secretary in settling some labor disputes. No one could deny the right of the government to buy its products from whom it chooses. Perhaps, even the two companies concerned are not interested at this time in bidding on any government contract. It was within the discretion of the government that one department should advise the other in such matters. But it is easy to assume that copies of all inter-departmental correspondence is not broadcast in press releases.

We do not know the details of the labor controversies in question. But we do know that the oil industry has had less disturbances as between employee and employer than any industry employing so many people, that wages and working conditions have always been better than in any comparable activity, and that there has been more controversy since the code than was during the whole of the industry's previous history.

Granting that the companies were wrong beyond argument, the punishment sought to be inflicted is far out of proportion to any possible crime against the few workers involved. For what the Secretary clearly intends is that the companies shall be deprived not only of their chance to sell to the government, but that they shall be held up to public scorn and thus suffer in their sales to the public, and that others be intimidated. That results will fall short of that intention does not remove the intention. Had Mr. Ickes the power he hopes for, the two culprits' punishment would extend to extinction of their business.

The public's attitude will be reflected in absolute unconcern, because the public too is getting tired. The Institute has voiced its position, and here is another proof that that position is well taken. Dictators are annoying even when they are impotent.

STANDARD Oil Company (Indiana) vs. Standard Oil Company (New Jersey) et al. The scene is the United States District Court at St. Louis. Basis of the complaint is that "Esso" is much like "S. O." Occasion for the petition is that Standard Oil Company (New Jersey) through its subsidiary Esso, Inc., has started selling petroleum products in the territory of the Standard Oil Company (Indiana). The objective is a restraining order to cause Standard Oil Company (New Jersey) to cease selling products under the Esso trade name in the fourteen states where the Standard Oil Company (Indiana) sells petroleum products.

Recently three retail outlets in St. Louis were opened by Esso, Inc. The suit is directed at this instance but the petition seeks to prevent use of the trade mark throughout all of the territory of the Standard Oil Company (Indiana).

Higher Crude Prices?

WHILE prevailing crude prices are generally profitable, especially in flush fields, there are, of course, some fields where existing quotations do not cover production costs. Along with pressure from independent refiners for better product prices, therefore, there also has come clamor among stripper well owners for maintenance or raising of crude prices.

All things considered, however, it would appear that crude prices are most likely to stay where they are, at least for some weeks longer. Pointing to that conclusion, in the first place, is the fact that the present relationship between crude and refined oil prices is virtually as prescribed in the oil code. The code will remain effective at least until the middle of June, when the National Recovery Act will expire, unless extended by Congress.

Indicating stationary crude prices for some time longer, in the second place, are the political considerations involved. To leave the existing crude price structure alone at present is to let a sleeping dog lie. Either to lower or to raise the crude postings might be to invite new laws to regulate the industry's affairs, including its prices—with Congress still in session. (It is predicted the national law makers will not adjourn until the beginning or middle of July.)

First Quarter Results Diverse

IN the opening three months of 1935 the oil industry as a whole had earnings closely comparable with those of the similar period last year. On the Pacific Coast, the companies did better, with improved markets prevailing. The Eastern and Middle Western companies, on the other hand, received lower prices for their products the first quarter this year than last year, and consequently reported lower earnings. (Prices have subsequently increased throughout the nation.)

The Wall Street Journal last week presented a table showing that 17 oil companies in the first quarter this year had aggregate net profit of $10,455,835, compared with $9,269,466 in the 1934 first quarter. In both quarters there were 14 companies showing profit and three showing loss. Two companies that reported loss this year also did so last year, but the third loser was not the same this year as last.

Demand Ahead of Last Year

FURTHER expansion of the demand for oils is indicated in the latest report of the Bureau of Mines on petroleum. The report indicates that in the opening three months of 1935 the total demand for all oils was a little over one percent greater than in the corresponding period last year. Domestic demand for gasoline was 1.8 percent higher.

In 1934 the total demand for all oils was back within six percent of the 1929 all time peak. In 1935 there will be a still nearer approach to the record level, judging by first quarter figures. At the bottom of the depression, the demand was only 15 percent under the 1929 peak.

Bright Picture in Oil

Strong markets and improved prices are bringing higher earnings. Better control is largely responsible for the industry's present favorable condition. Feared federal bills are still far from enactment. State oil control laws are now stronger. First half of year promises to be more profitable in 1935 than in 1934. Petroleum demand continues to increase.

JACK LOGAN
Associate Editor

OUTLOOK

THE petroleum industry is having its difficulties and its fears. There is anxiety especially regarding what Congress may do to the industry, before reaching the adjournment for which business generally yearns. But the picture in oil is, nevertheless, predominantly bright.

Traders in securities, more than casually interested lately in oil stocks, obviously consider the industry's prospects good. Numerous oil company heads have exhibited optimism, in recent annual reports to stockholders. The economists and statisticians, modern fortune tellers, can see favorable trends and improved earnings in the cards—although less propitious cards may yet fall in the new deal.

Strong Markets Improve Earnings

OILS are being consumed in volumes not far under all-time peak levels. Supply is being balanced successfully with the demand. Strong markets are resulting. Product prices, wholesale and retail, have not yet stopped in their advance that has been under way nearly three months. Meanwhile, the prospects for higher crude prices have become increasingly better. The favorable prices and relatively large volume of business are enabling the industry to show profit in all its branches. (Until recently, the results in the refining and marketing branches were generally unsatisfactory.) With additional advance of prices quite possible, moreover, there are fair prospects for still further improvement in earnings.

Control Is at Bottom of Stability

PRIMARILY responsible for the present healthy condition of the petroleum industry is today's especially effective balancing of supply with demand. While similar balance has been maintained rather consistently for several years, it has been only lately that production control has assumed a more stabilized, permanent form. For the markets to be strong, there must be not only effective control, but also general confidence that the successful regulation will be reasonably lasting. Such confidence has prevailed lately. It has been generated especially by the Connally Act, which is barring hot oil and products from interstate commerce. Also promoting confidence as well as better enforcement have been the new oil control laws lately enacted in Texas, as well as court decisions upholding the state authorities in their enforcement activities.

Industry's Position Basically Strong

IN addition to the present favorable supply-demand relationship, there are also various fundamental conditions indicating an especially favorable outlook for the petroleum industry. Of this nature is the strong demand for oils, back in 1934 within six percent of the 1929 peak, and in 1935 still nearer the record levels. The storage situation is also especially favorable, the stocks of all oils having been reduced consistently for about five years, until they now are the lowest since 1926. While the supply from domestic and foreign fields is under strict control through regulation of production and imports, the potential supply in the form of stored oils is relatively scarce.

The oil reserves situation furnishes another fundamental factor that may be regarded as favorable to the industry. Important oil field discoveries have been relatively scarce during the past three years. Meanwhile, the existing flush fields, including East Texas, have been gradually but appreciably dissipating their producing ability. Flush fields are hanging less heavily over the industry, therefore, and the threat of temporary overproduction is less menacing. Instead, there is increasing concern over reserves for the future. Consequently, the existing reserves, underground and above ground, are assuming increased importance and higher

values. The markets will, in time, feel this influence, if they are not already feeling it.

MARKETS

Refinery Prices Still Rising

THE prices for petroleum products, at refineries and service stations, have continued on the upward trend, which was initiated about March 1, with effectiveness of the Connally Act. In the Mid-Continent kerosene prices have gained another eighth-cent in the past week, and natural gasoline has shown further improvement. Gasoline tank car prices last week were unchanged from the previous week, whereas most weeks since March 1 have furnished eighth-cent gains. The Mid-Continent gasoline prices at the refineries are, however, at relatively high levels by now, being a full cent or more per gallon higher than on March 1 for all areas and grades.

At East Texas and North Texas refineries an average price of 4½ cents a gallon was prevailing the latter part of the past week for U. S. motor gasoline of low octane rating. Standard grade was bringing 5 cents, and premium material 5¼ cents. In the Group Three (Oklahoma) region, corresponding prices were one eighth-cent higher. Kerosene was priced at 3¾ cents a gallon at East Texas refineries, 3⅞ cents in North Texas, and 4 cents in Oklahoma.

East Texas Control Effective

BOLSTERING the Mid-Continent market was an exceptionally small volume of hot oil producing and refining in East Texas. Traffic in illegal material is reported to be down to a virtually negligible volume, estimates of hot oil output being down to 10,000 barrels daily or less. While about 60 East Texas refineries are idle, only about a dozen are active, and they are operating almost exclusively on legal crude.

Federal and state tender boards are very strict in considering applications for tenders for moving material by rail. The few plants that are disposing of questionable material are doing so by trucks. However, the supply available for meeting the truck demand is relatively scarce, as evidenced by sharp improvement lately in prices on the trucked shipments. Tank truck prices have lately been around the same levels as tank car prices.

TENDING to bolster enforcement in East Texas have been various recent victories of the authorities. A refinery was recently thrown into receivership because of alleged repeated violations of the oil control laws. The Texas legislature has lately provided stricter oil laws, including one just signed by the governor, providing for state confiscation of illegally stored or transported oils. Also several recent court decisions have upheld the state officials, discouraging litigation attacking the oil conservation laws and orders.

Substantiating the reports of lowered hot oil operations was the report of engineers that average reservoir pressure of the East Texas field at the opening of May was the same as on April 1.

Crude Market Firm With Demand Strong

THE sharp improvement in tank car prices during the past 2½ months has encouraged resumption of operations by numerous long-idle refineries throughout the Mid-Continent. Many of the plants had been inactive for several years, because of the ruinous competition by East Texas refineries.

This development has brought a pronounced stiffening of the crude oil market, increasing the possibility that crude postings will show improvement.

Some of the independent refineries that have resumed operation have been obliged to go to major companies for raw material. They are buying the crude from the large concerns at posted prices plus transportation and marketing charges, the latter item being the equivalent of a premium.

Meanwhile, there has been active competition among crude purchasers for new well connections, especially in East Texas and some other areas.

Crude and Refined Prices in Line

IN view of the above circumstances, producers are naturally entertaining hopes of improvement in crude oil prices. On the other hand, however, it is more or less generally contended that the existing crude prices have only lately become justified, through the material advance of product prices. Independent refiners some weeks ago appealed to the federal government to exert its influence toward forcing reduction of crude postings, so they could show profit on products turned out, or else toward boosting of refined oil prices. About a week ago, a supplemental report was made by Oil Administrator Ickes' committee that investigated the effect of the oil code on small enterprises. The committee said it expected some small additional advances in both tank car and retail gasoline prices, and indicated that the anticipated small increases were required to bring product prices fully to a parity with existing crude prices. The additional gain in tank car prices should be at least one fourth-cent, the committee said, and without such gain, crude prices should within the near future be lowered about five cents a barrel.

The committee's suggestions as to parity between crude and refined oil prices are in accordance with the ratio recommended as equitable in the oil code. Based on the relationship that prevailed in the five years, 1928-1932, the code indicated as desirable a ratio in which the crude price per barrel is 18.5 times the tank car price per gallon of gasoline made therefrom. Gasoline prices are almost but not quite high enough to be in such ratio with today's crude prices.

(Continued on page 51)

Advances in Drilling *Technique Reviewed at* Institute Meeting

Tulsa.—Two important topics of discussion stood out at the American Petroleum Institute's fifth mid-year meeting of the Division of Production, held here May 14-16. They were: (1) the improved present statistical and economical situation and its future prospects and (2) advancements made in drilling and producing practices and equipment.

Naturally, engineering developments were of first consideration because of the program of the meeting, but, nevertheless, the attending oil men gathered in small groups in which the favored subject was the economic picture. The trend of talk with hardly an exception, was that the present situation is favorable and that the future outlook was even more promising of improvement. It was pointed out repeatedly that the refined gasoline market has continued to strengthen until it now appears probable that there will be an increase in the price of crude oil.

The strengthening of the gasoline market has been due mostly to a better control of the production and movement of hot oil from the East Texas field. With a lessened quantity of this cut-priced product reaching markets, gasoline prices have advanced steadily. It was generally believed that the East Texas hot oil situation is more likely to improve than to go back to its former status in which large volumes of cheap oil practically wrecked the oil-product market.

With East Texas hot oil controlled it also was the general expression of thought that drilling throughout the nation would increase, as the demand of petroleum is now at an all-time high and no doubt will increase considerably during the approaching summer season. This forecasted consumption demand would, naturally, cause the seeking of additional crude oil reserves, which will be needed in the future if present conditions continue to hold.

Technical Studies

Drill pipe was the subject of discussion in the first technical session. Forging an upset on the drill pipe to act as a tool joint will overcome failures traceable to threaded connections, it was said by H. W. Graham, of Jones and Laughlin Steel Corporation, Pittsburg, in a paper entitled "The Development of Rotary Drill Pipe." Mr. Graham traced the development of rotary drill pipe from the initial use of welded merchant pipe and the later use of seamless tubes improved by metallurgical advancement.

H. W. Fletcher, Hughes Tool Company, Houston, traced the development of drill stems used in rotary drilling and discussed causes of failure, chief of which he held to be fatigue, possibly accelerated by corrosion, with vibration another principal destructive factor. Mr. Fletcher saw little hope of a marked reduction in failures through metallurgical improvement, but believes that changes in design will obtain advancement. His paper is presented in full elsewhere in this issue.

Slow production of crude oil to preserve equilibrium between oil, which occupies the larger capillary spaces in reservoir rock, and water, which occupies the smaller spaces, was recommended by Allen D. Garrison, of the Department of Physical Chemistry, Rice Institute, Houston. Speaking on "Selective Wetting of Reservoir Rock and Its Relation to Oil Production," Mr. Garrison said that recent investigations in colloid chemistry have revealed, with some certainty, the magnitude of the interfacial or film forces acting within the capillary spaces of reservoir rock, and have indicated that a high rate of production causes water to fill larger pores formerly occupied by oil, thus destroying the equilibrium between water and oil in the network of capillary spaces. He explained that rapid production increased the force, or wick action, which causes water to advance to the larger pores and advances the time when water is forced from the small crevices into the oil stream.

Apparatus designed to obtain, from within wells, sub-surface samples of oil and gas for laboratory examination was described by Ralph J. Schilthuis, Humble Oil & Refining Company, Houston. Explaining that during production, oil and gas undergo chauges both in volume and in state because of the influence of pressures and temperatures, Mr. Schilthuis said the solution of many production problems depends upon knowledge of the characteristics of oil and gas in their original condition. He described a subsurface sampler that is lowered into the well on a wire line.

Alexander Deussen, consulting geologist, and E. G. Leonardon, Schlumberger Well Survey Corporation of Texas, both of Houston, described how electrical surveys are being used advan-

World Oil Congress *Planned In United States* During 1936

Tulsa.—The board of directors of the American Petroleum Institute May 15 authorized President Axtell J. Byles to appoint a special committee to report to the executive committee on the feasibility of holding the Second World Petroleum Congress in the United States during 1936 under auspices of the Institute. The invitation came from the Institution of Petroleum Technologists, which said the congress, designed to permit the study of the industry's technical problems, probably would have the cooperation of such other organizations as the American Association of Petroleum Geologists, American Institute of Mining and Metallurgical Engineers, Western Petroleum Refiners' Association, National Petroleum Association, Natural Gasoline Association of America, and the California Natural Gasoline Association. The special committee will be appointed shortly.

The board of directors in the same meeting, which was held in connection with the American Petroleum Institute Mid-Year Meeting, also received an informal group headed by Lester M. Goldsmith, Atlantic Pipe Line Company, Philadalphia, which requested the formation of an Institute committee to study the advisability and need for a permanent electrical committee. The request was approved and President Byles was authorized to appoint a committee that will report not later than November, 1935.

The board received and approved the report of Baird H. Markham, director of the American Petroleum Industries Committee, covering the work of the organization in the fields of taxation and legislation during 1934 and to date in 1935. Explaining that a deluge of legislation affecting the industry had necessitated extreme activity on the part of the committee, Markham said the group is not optimistic about the future because of the expected attempts of many state legislatures to seek to raise additional revenue by further taxation of the industry and its products.

tageously during drilling process. Electrical measurements are based largely upon the ability of some sub-surface rocks to conduct electricity, while others resist it. The capability of rocks to transmit electric current was ascribed to the absorbed water they contain, the water, plus dissolved salts, constituting electrolyte necessary for the conduction of current. Porous rocks, because of the larger water and salt content, consequently, are more highly conductive of electricty than are compacted rocks in which the moisture content is small. High resistivity is encountered in oil-bearing formations.

Methods for determining how much of a frozen or cemented column of pipe is free were outlined by J. T. Hayward, Barnsdall Oil Company, Tulso. Methods of cementing producing wells to exclude water were discussed by R. E. Watson, Humble Oil & Refining Company, San Antonio.

In addition to the papers presented and discussed at the various open sessions all API committees were meeting and formulating plans for the future, largely the program to be presented at the Los Angeles annual meeting in November. From tentative drafted plans an excellent technical and engineering program will be given at that time.

The Mid-Year Meeting this year was exceptionally gratifying due to its large attendance and the amount of interest in discussions. The large number of men in attendance made it look like former years, when every one was present and taking an active part.

A. P. I. Division of Production Moves Offices

Dallas.—The office of the Division of Production of the American Petroleum Institute, Dallas, formerly 1508 Kirby Building, has been moved to 1508 Gulf States Building, Main and Akard streets, which is across the street from its previous location.

Senate and House Far From Agreement on Nira *Extension*

Washington, D. C.—With passage by the Senate May 14 of the Clark resolution extending the Industrial Recovery Act until April 1, 1936, with a provision that codes shall not apply to persons wholly engaged in intra-state business and a ban on price-fixing provisions in any codes other than those for mineral material resource industries which now contain them, the rift between the Senate and the House of Representatives—prepared to support the President's plan for a two-year extension—widened to a point which threatened the failure of any legislation and the lapse by expiration of the present law.

Under the Clark resolution, inclusion at a later date of any price fixing provisions in the oil code would be banned.

The measure was adopted as reported by the Finance Committee, under a more or less general agreement that no amendments be offered so that the legislation might be expedited.

At the same time, leaders in the Senate warned that they would not accept any amendments by the House designed to make effective the Administration's plan for a two-year extension of the law, Senator Harrison of Mississippi, chairman of the Finance Committee and staunch Administration supporter, telling the Senate that if the House rewrote the resolution he would not send it to conference but would seek its consideration by the Senate as new legislation.

Battle lines for the fight were drawn May 16 upon the announcement that President Roosevelt and NRA leaders had agreed on a seven-point program for revision of the law, which would be supported by the House.

The Administration program provides for two-year extension; a period of three to six months for revision of existing codes, limitation of codes to interstate businesses and intra-state businesses substantially affecting interstate commerce, provision for voluntary codes with authority to impose limited codes; protection against practices tending to monopoly and the destruction of small businesses; improvement of code making and enforcement, the latter to be primarily through injunctions and cease-and-desist orders; and provision for hearings, judicial review and other processes to protect individual rights and small enterprises.

Meanwhile, Donald R. Richberg, chairman of the National Industrial Recovery Board, stepped into a hornet's nest when he addressed members of the NRA and, discussing the pending legislation, called the Senate's 10-month extension "complete folly."

Charging Richberg with harboring "ambition to be a Mussolini," Senator Clark called the NRA official's speech the most brazen exhibition of impudence on the part of a "bureaucrat" he had ever seen.

Administration leaders in the Senate claimed they had 55 votes for approval of the President's plan, if adopted by the House. This, however, was scouted by the anti-NRA group, members of which predicted that if the Administration sought to force acceptance of the plan it would never come up for a vote in time to save the recovery act from expiration June 16.

Hearings on the measure will be started May 20 by the House Ways and Means Committee, with NRA officials expected to be the first witnesses.

Initial Action *at Proration Hearing* For Texas Gas Control

Austin, Texas.—At a general proration hearing May 16, the Texas Railroad Commission began a systematic study of the control of the production of gas in Texas. This was the first hearing before the commission to institute plans for the enforcement of a measure passed at the recent session of the legislature for the purpose of preventing waste of natural gas in Texas, especially in the Panhandle area.

The first step taken by the commission was to require purchasers of Texas gas to file at this hearing a statement of probable needs for gas produced in the state during June. While the commission is not expected to inaugurate a proration program immediately, especially in the Panhandle fields, the first problem which confronted it was to determine the actual market demand for gas.

Several companies filed nominations at the hearing. These nominations will form the basis for the commission to determine which sources of supply shall furnish the production required.

E .L. Rowlins, gas engineer from the United States Bureau of Mines was present at the hearing and outlined the results of tests made by the federal agency in arriving at a proper method for determining the potential of gas wells. He stated that this problem had been studied continuously since 1929. The primary purpose was to find some method of determining

(*Continued on page 48*)

MEN IN THE INDUSTRY'S NEWS

C. V. SIDWELL Becomes General Field Superintendent for British American Oil Producing Company

CARROLL V. SIDWELL, for the past six years a production engineer for Amerada Petroleum Corporation, resigned effective May 10 to become general field superintendent for British American Oil Producing Company with headquarters in Tulsa. He succeeds William J. Collier, who has been placed on the retired list. Although a native of Colorado he attended grammar and high schools in Oklahoma City and graduated in 1923 with a bachelor of science degree in geological engineering from the University of Oklahoma. After one semester of post-graduate work he left the university to become a field engineer and later assistant superintendent of production for Huasteca Petroleum Company in Tampico, Mexico. He returned to the United States in November, 1928, and immediately joined the engineering staff of Amerada Petroleum Corporation. In conjunction with C. V. Millikan, chief engineer, he pioneered the study of formation pressures and their application to production practices and more recently has devoted a considerable portion of his time to the study of proration problems especially in the Seminole district where he has made headquarters for several years.

CARROLL V. SIDWELL

JOHN CULLEN, head of the income tax department of Continental Oil Company at Ponca City, spent several days in Tulsa and Bartlesville in conference with tax men of other companies. Cullen formerly served in the Oil and Gas Valuation Section of the Federal Income Tax Unit at Washington, D. C.

GEORGE S. ROLLIN, vice president in charge of the Mid-Continent division of Shell Petroleum Corporation, spent the early part of the week at company headquarters in St. Louis.

H. D. PATRIDGE, manager of purchases for Indian Territory Illuminating Oil Company, Bartlesville, Oklahoma, recently was elected district vice president of the National Association of Purchasing Agents. He succeeds W. R. Heyman, Oklahoma City.

L. M. JONES, district landman for Stanolind Oil & Gas Company at Wichita, Kansas, has been transferred to the Tulsa headquarters. He is succeeded by C. E. Maule, transferred from Muskegon, Michigan.

EDGAR TOBIN, of Edgar Tobin Aerial Surveys, Inc., will be the principal speaker at the regular meeting of the San Antonio Geological Society to be held at the Petroleum Club, San Antonio, May 27. The meeting date has been changed from May 20 so as not to conflict with the National Oil Scouts convention. Tobin will discuss the science of aerial photography and its relation to geology. Dinner will be served at 7:00 p.m.

PAUL G. BLAZER, president of Ashland Refining Company, Ashland, Kentucky, has been elected president of Swiss Oil Corporation of Lexington, Kentucky. The concern owns stripper well production in eastern Kentucky. James L. Martin, Chicago, was elected chairman of the board. E. W. Seaton, treasurer of Ashland Refining Company, was elected treasurer of Swiss Oil Corporation. He succeeds James H. Combs of Lexington, who will continue as secretary and has been elected a director. The home office of Swiss Oil Corporation will remain in Lexington in charge of E. L. McDonald, vice president and general counsel. The treasury, accounting and operating offices will be moved to Ashland.

S. F. SHAW is consulting engineer to Mid-Texas Petroleum Company, which company is building a gas-lift plant in the Oklahoma City field.

DIED:

F. C. PROCTOR of Houston, for many years general counsel for the Gulf Companies and more recently special counsel for that group and for The Pure Oil Company and Union Sulphur Company, died May 14 at New York. He was 69 years old. A native of Texas and a graduate of that state's university, he began practice of law in 1887 at Victoria, and became general counsel for the Gulf Companies at Beaumont in 1905, moving to Houston in 1916 when operating headquarters of the group were moved to that city. He resigned as general counsel in 1919 but remained on retainer by the Gulf Companies after entering general practice. Recognized as an authority on mineral laws and pipe line matters, he handled successfully a number of such cases of national import. In public matters he had life membership in the American Law Institute, was a member of the national, state and county bar associations, member and former director of the American Petroleum Institute, and member of the Mid-Continent Oil & Gas Association. The funeral was at Houston. He is survived by his widow; a son, D. C. Proctor of Fort Worth, and two daughters, Mrs. Terrence Kenyon and Mrs. Walter Weber, both of London, England.

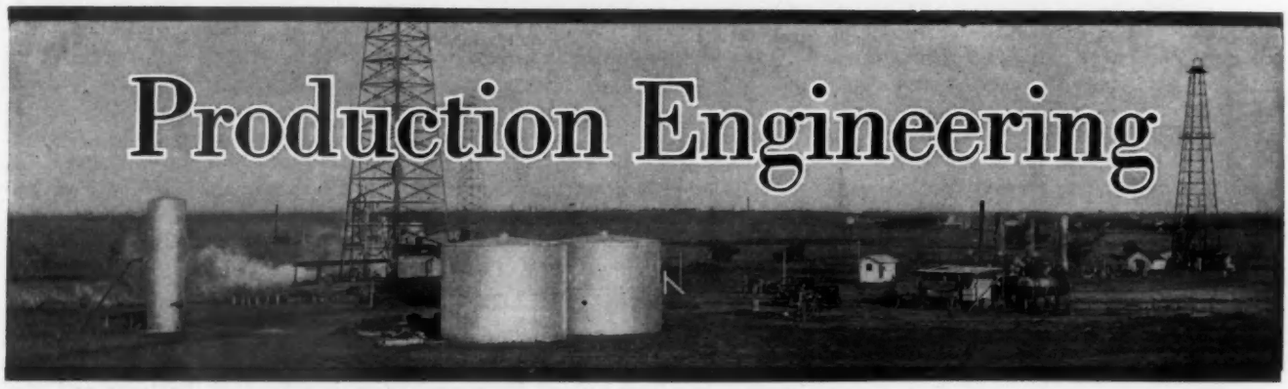
JOHN MITCHELL DAVIS, in charge of the land department for Luling Oil and Gas Company and associated companies, San Antonio, died May 13, as a result of injuries received when the derrick gave away on one of the companys' operations in the Pettus area.

WILLIAM GRAVES TITCOMB, 70 years, of San Antonio, was buried May 14. He is a well known independent operator, having been engaged in the oil business in both Texas and California for a number of years. Among the survivors is C. B. Bunte, a step son, South Texas oil operator.

REED

REED ROTARY DRILLING TOOLS

ROLLER BIT CO.



Kettleman Hills *High-Pressure Well Flow* Measured By Meters

Coefficients for adjusting errors are developed and meters check closely with tank gauges

BRAD MILLS
Associate Editor

USE of meters for measuring oil from all types of flowing wells has become a common practice in the Kettleman Hills field. The meters are proving successful, the accuracy and efficiency of the average meter installation having been developed through application of coefficients that have been determined by well action at various metering pressures. Daily production as shown by individual and group well meters ordinarily checks so closely with the storage tank gauge that the error is negligible.

Although coefficients determined and used in the Kettleman Hills field might not apply to other flowing fields, enough pioneering work has been done to indicate the accuracy of metering high-pressure wells in any field. Early attempts to meter flowing wells in Los Angeles basin fields were not successful, due to the surging action of the flow, excess gas and the error caused by the gas held in solution.

Kettleman North Dome Association deserves a large share of the credit for development of a metering technique that will have a far reaching effect upon production practices of the future. Coefficients for adjusting the error

Two-inch current type oil meter used at Kettleman Hills. The balance valve is in the background.

recorded because of gas held in solution under pressure after passing through the trap have been determined for the various metering pressures and conditions, and their daily application causes the meters to check remarkably close with actual storage tank gauges.

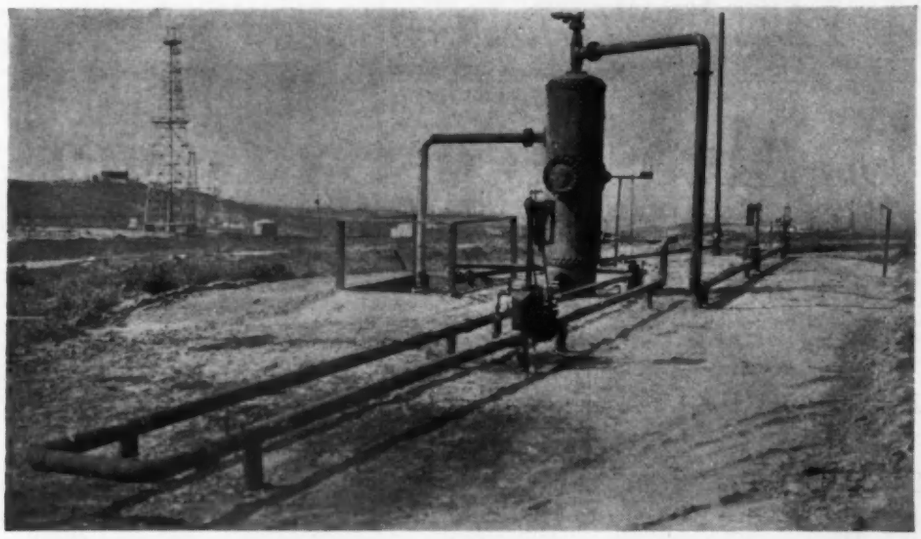
In using meters on flowing wells, several conditions are met. It is the practice on all wells, however, to pass the flow through a trap to remove as much of the free gas as possible before metering the oil. Through a long series of tests, checks and experiments, correction co-efficients for the different metering pressures have been established. Gas left in solution after passing the well flow through the trap was a much greater factor than commonly has been supposed. This type of gas in oil metered under high pressures gives a greater error than the gas in oil metered at lower pressures, but regardless of metering pressure, corrections through coefficients may be made quickly.

Metering practices are varied to meet well and field conditions. Since a pressure of about 500 pounds is carried on the main gas lines taking fuel from the field, it would normally be advantageous to trap and meter the oil at such a pressure in order that the gas from the traps could be sent directly to these 500-pound gas lines. Many wells, however, do not flow at a pressure great enough to permit trapping and metering that will give a return of the separated gas at the 500-pound line pressure.

Gas Handling Method

In handling the flow from high-pressure flowing wells, separation ahead of the metering takes place at a pressure of about 500 pounds. Gas is taken off the traps and sent immediately to the 500-pound field wet gas collecting line. The oil is metered at about the same pressure. The oil and gas that remains in solution, after metering at the 500-pound pressure, go to the 50-pound group of traps. After this stage of separation, the oil goes to field storage tanks. The gas is taken off the 50-pound traps and sent to the gas plant for compression to 500 pounds. Vapors are drawn from the field storage tanks in the conventional manner.

In a group of wells that will not flow with a line pressure of 500 pounds, separation takes place at a trap pressure of 125 pounds, and metering takes place at about the same pressure. The gas from the trap is sent to the gas plant for compression to 500 pounds. The oil and gas that remains in



The latest type orifice meter installation. The oil and gas meters are on opposite sides of the trap.

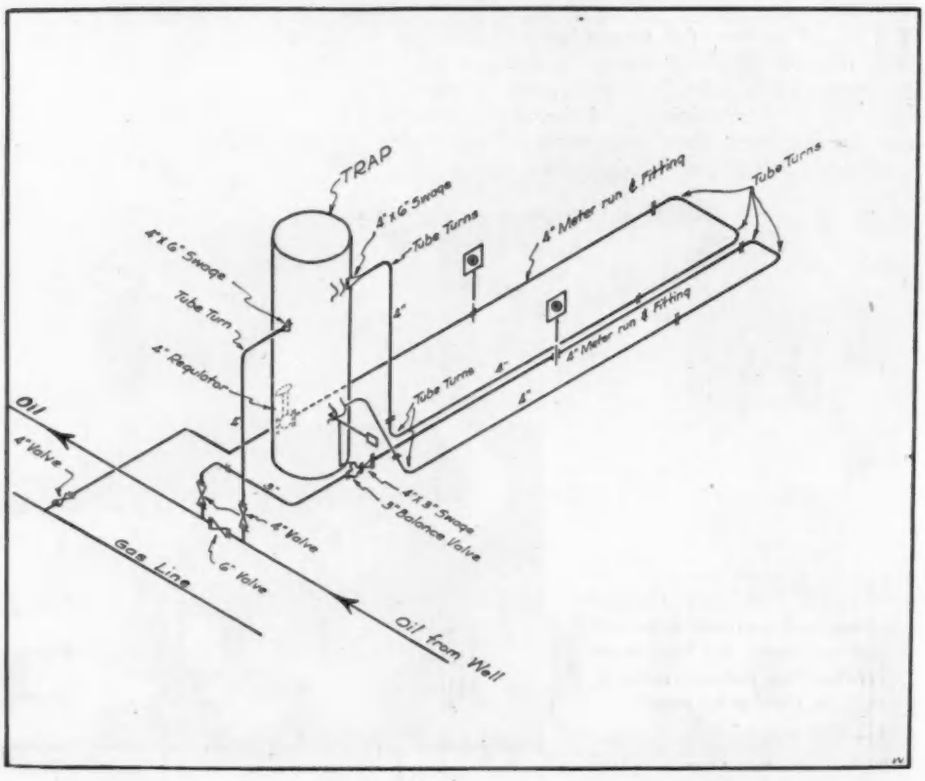


Diagram of one of the original metering trap settings at Kettleman Hills. As originally operated, the flows of gas and oil were run together after metering was completed, and the combined flow sent to traps for separation. This practice has been largely discontinued.

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solution are sent to the group of 50-pound traps in exactly the same manner as the flow from the 500-pound metering installations.

In the case of a few wells, separation and metering take place at 125 pounds, but the 50-pound separation stage is omitted. In this type of installation the oil and gas held in solution go from the 125-pound metering pressure to atmosphere, or storage.

A few weak wells that will not make the 125-pound stage are metered at a trap pressure of about 80 pounds. In this type of installation the gas and oil are run together after separation and metering, and the combined flow, which is about the same as that coming from the well, is sent to the 50-pound group of traps. In this type of well the flow is separated only because it is necessary to do so for metering the oil accurately.

The one exception in this group of producers is a well that has its flow trapped and metered at 80 pounds, with the flow going to storage and omitting the 50-pound separation stage.

Meter Installation

The float valve on the separator is removed, and the control is held by a balance valve, which in turn is operated by a trap float lever. The primary idea is to hold the pressure on the oil until it is metered.

The flow from the well enters the trap in the usual manner. The gas leaves the trap by way of a four-inch meter run and is metered with an orifice meter. The flow of oil and whatever gas is held in solution at trap pressure leave the trap through a four-inch line. The oil is metered either with an orifice or current type meter and passes immediately through the balance valve to the line leading to the 50-pound traps. The pressure on the installation from the time of entry of the flow into the trap to the balance valve is held fairly even and constant.

Four-inch orifice meters and three-inch and two-inch current type meters are used. The current flow meter is of the velocity type. The balance valves have been installed in the meter run downstream from the oil meter and at a point under the separator float arm, by which the balance valve is actuated. It is very essential that the float valve of the separator be removed.

Corrections are made for "flow error" and temperature. It has not been necessary to correct for viscosity. Due to the gas remaining in solution during metering and after trapping, a considerable error takes place. This error runs from 10 to 12 percent when metering is done at 500 pounds. In metering at a pressure of 125 pounds the error runs from four to five percent. Coefficients have been established to correct these errors, and their application has reduced the difference between the volume shown by the meters and actual storage tank gauges to one percent or less.

Average daily production of wells on meters is about 1000 barrels. Extremely low or high rates of flow affect the accuracy of meters. The maximum efficient rate of flow per well is about 2500 barrels daily, this limitation being imposed chiefly by the trap capacity. Obviously when the rate of flow exceeds the trap capacity, free gas breaks over with the oil and renders the meter inaccurate.

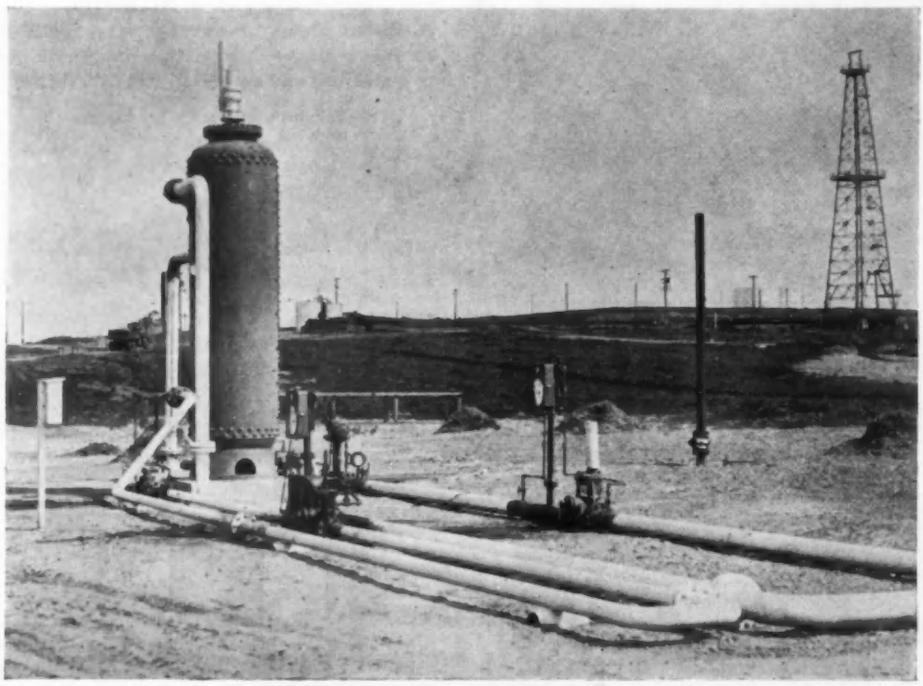
Water is metered and prorated back to the wells, with the well cut record being used as a basis for the charge-back. Errors are prorated back to the wells on the basis of well production. Over a considerable period of time, this method is considered very equitable.

Well temperatures remain fairly even, but regular readings are made as a check. Oil is bled from the metering line through a small sample bomb until it reaches the approximate line temperature. Oil is then trapped in the bomb at metering pressure and temperature. The pressure is released and the gas allowed to escape. The remaining oil volume is then determined. The difference of this volume corrected to line temperature and the original bomb volume gives the oil shrinkage factor for the gas remaining in solution.

Other corrections are obtained from standard metering tables. North Dome wells produce in a consistent manner and usual corrections are not difficult to make. The oil runs from 35 to 41 gravity in wells completed to produce from the intermediate and lower sections of the main producing formation.

Kettleman North Dome Association has placed 30 wells on meters, and has had little trouble with average producers. Two pumpers are able to handle 24 wells on meters. When a well produces a high percentage of emulsion, which is not general, orifice meters give some trouble. The current type meters do not plug up as quickly under these conditions. Both types are accurate under average field conditions, however.

Standard Oil Company of California has been using meters at Kettleman Hills for some time, and has helped to establish coefficients applicable to North Dome conditions. This company's metering installation does not differ radically from those adopted by Kettleman North Dome Association, except that under no condition are the gas and oil run together after metering. Most of the meters are current flow types.



An early type orifice meter installation. The oil and gas lines run in parallel on one side of the gas trap.

Methods of Determining
How Much of a Frozen or Cemented Column of Pipe is Free

J. T. HAYWARD
Barnsdall Oil Company
Tulsa, Oklahoma

DRILL pipe and casing sometimes accidentally become stuck in the hole. Some method of finding out where the pipe is frozen is then desirable, so that decisions can be made as to whether to make further efforts to free it or to cut or shoot it off and side track. In the latter case what we require to know is how much is frozen so that a shot can be properly placed, or the knife run a minimum number of times and yet recover as much as possible. The object of the present paper is to outline methods for determining where the pipe is stuck, or conversely how much is free.

There is another direction in which this information may be useful. It is becoming of increasing importance, when casing is cemented, to know how far up the column is actually cemented. There are, for instance, occasions when it is important that the cement should not come up beyond a certain height and cover an upper show that could be later exploited by cutting and pulling the pipe or perforating with the gun. At other times, it is wished to bring the cement above a certain level, so that water may be shut off from oil sands behind the pipe, and the latter later produced through perforations. It is also probable that too much cement is often used on a job on account of the uncertainty, leading to unnecessary expenditure on cement, excessive back pressure on the producing formation where this has already been drilled, and the loss of pipe if and when the well is abandoned.

The assumptions, made when calculating the number of sacks of cement required to reach to a given height behind a column of casing, contain a number of possibilities of error. It is suggested that, after a column of pipe has been cemented and before drilling is resumed, the height to which the cement has actually risen and formed a bond be checked and recorded for future reference. The following two methods for determining the amount of pipe that is free have been worked out and used with success in practice.

This paper was read before the Mid-Year Meeting, American Petroleum Institute, Tulsa, Oklahoma, May 16, 1935.

THE first method depends upon the weight indicator, the underlying principle being to change the longitudinal stress in the column while measuring the change in stretch, and from the data so obtained to calculate the free length. This method is not new, but the manner in which it is carried out and the precautions taken to minimize errors due to friction are, the writer believes, published for the first time.

If the weight indicator does not read in pounds, the readings in points must be converted to pounds; and if the indicator is on the dead line and indicates the line pull, the readings converted to pounds must be multiplied by the number of lines going to the traveling block, the product giving the pounds pull exerted by the hook.

Examine the weight indicator, and make the adjustments recommended by its maker to insure proper working.

Lash a wooden lath, or stick a strip of paper vertically on the pipe at such a height that marks can be made upon it corresponding to the stretch of the pipe in the hole when various pulls are taken in it. Care should be taken to select a base, or fixed point to mark from, that does not settle when the load on the derrick is increased.

Determine two readings on the weight indicator, such that the lower corresponds to a pull on the pipe that is something more than sufficient to take the slack out of it, and the higher to the maximum pull that is considered safe. Call these two readings respectively "T-min." and "T-max."

Slack off until the tension is less than "T-min.," and then pull up until the indicator reads "T-min.," being careful to pull up to the reading without slacking off. Mark the strip of paper with a horizontal line, and call this mark "M."

Now pull up to some tension greater than "T-min." and slack off carefully until the indicator reads "T-min." and again mark the strip, calling this mark "N." Owing to friction in the sheaves and of the pipe in the hole, mark "N" will probably be some distance below mark "M."

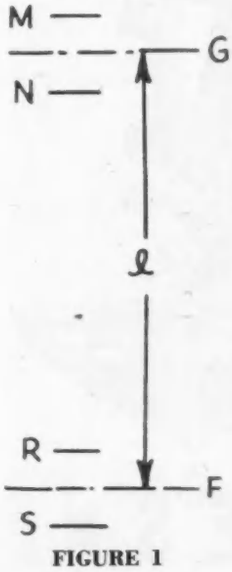


FIGURE 1

Repeat the above operations at "T-max." and obtain another two marks, "R" and "S," on the strip. Remove the strip of paper and draw a line, "G," between and equi-distant from "M" and "N," and draw another line, "F," between and equi-distant from "R" and "S." The marks on the strips should now appear as in Figure 1. The distance "F" to "G" is the stretch in the column,

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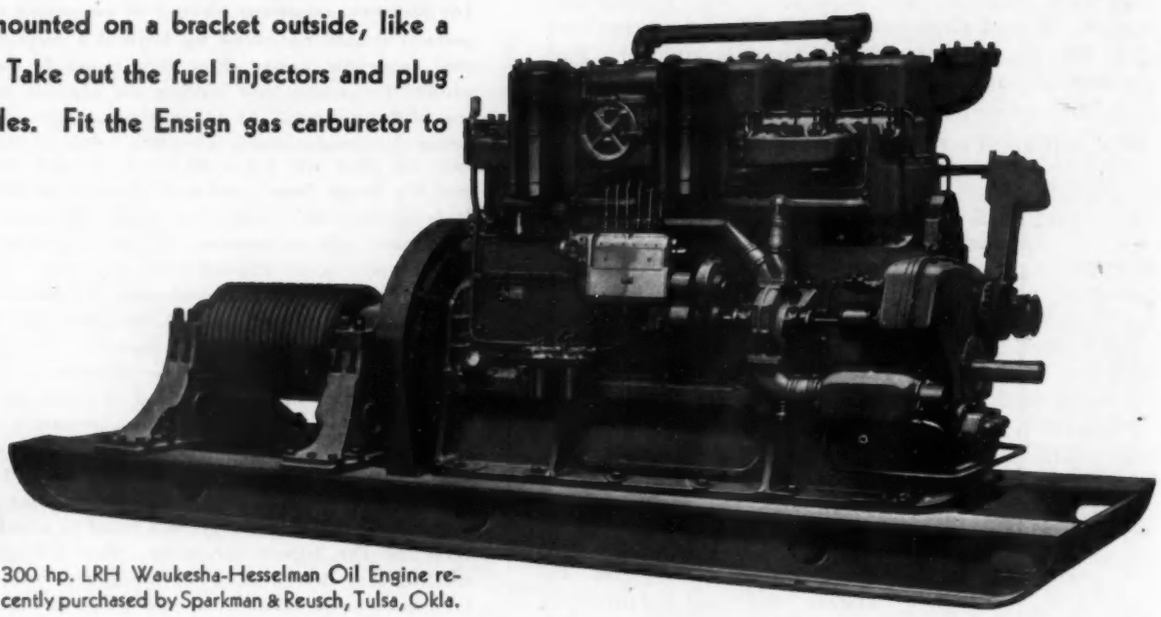

300 hp. LRH Waukesha-Hesselman Oil Engine recently purchased by Sparkman & Reusch, Tulsa, Okla.

WAUKESHA ENGINES

caused by a change in total tension, of "T-max." minus "T-min." (see Figure 1).

Let e = the stretch in inches.

A = the cross-sectional area of the pipe in square inches.

P = "T-max." minus "T-min." in pounds pull on column.

E = Young's modulus—30,000,000.

L = free length of column in the hole.

Then:

$$L = \frac{E \times e \times A}{12P} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Since pipe is usually listed and specified according to weight per foot rather than cross-sectional area, the following equation may be more convenient than equation (1).

$$L = \frac{E \times e \times w}{40.8P}$$

Where w = the weight in pounds per foot.

The accuracy of the result will depend, in the first place,

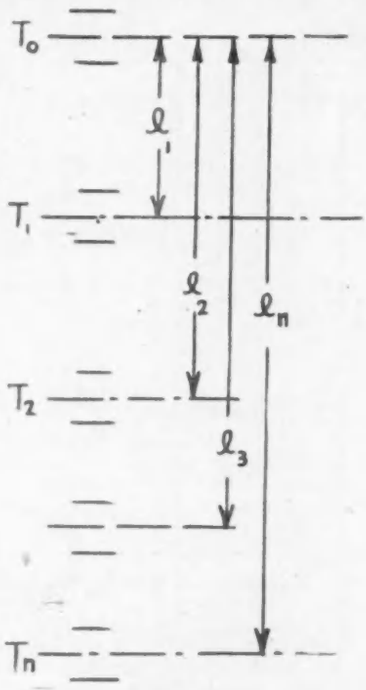

FIGURE 2

upon the accuracy of the weight indicator. A recent test made by the writer of an indicator of a new type, working on the dead line and reading in pounds, showed an error not exceeding plus or minus 2 percent. While it is probable that the average indicator under ordinary working conditions does not attain this accuracy, it can be approached by careful attention to the adjustment of the instrument. Fortunately for the present purpose, differential measurements with the indicator are much more accurate than absolute readings; and if the instrument is in good condition and is properly adjusted before the test, it is believed that an error not exceeding plus or minus 5 percent can be depended upon.

Another possible source of error lies in the assumed value for "E," and the effect upon it, of the joints; but it is believed that this is actually negligible. If the string of pipe be considered as a homogeneous column of constant cross-section equivalent to the wall of the pipe, give in the joints will reduce the apparent value of "E," while the additional thickness at the coupling will increase the value of "E," the two effects being in opposition and tending to neutralize each other. Again, in any column of pipe in a well, the sum of the lengths of the joints is small as compared with the total length of pipe, and variations in the stress/strain relationship at the joints would have a corresponding small effect upon the ratio for the column as a whole.

That 30,000,000 is not far from the correct value for "E" appears to be borne out in practice. Limited tests carried out by one of the pipe companies indicated that the effect of the joint was negligible. Again, in the cases where the writer has used the method outlined above to endeavor to determine the position at which a column of pipe was frozen, the subsequent operations at three of them have furnished a check upon the correctness of the calculations and indicated an error of less than 5 percent.

A further possible error may be introduced if the measured stretch includes slack in the column as well as true strain. Usually it is not difficult to determine when the slack has been taken up; but if there is any doubt, one of the following methods can be used. If the column of pipe is not too long, "T-min." may be made equal to the weight of the pipe. For long columns, where the weight may approach the safe pull, the following procedure may be followed:

Instead of using two readings, "T-min." and "T-max.," select several, "T-0," "T-1," "T-2," "T-n," etc., so that "T-0" is zero and "T-n" is the maximum pull that it is considered safe to put on the pipe. At each of these readings obtain the stretch, pulling up to and slacking off to each indicator reading, and bi-secting the distances as already described. The marks on the strip of paper will then appear as in Figure 2.

Plot the strains against the tensions as in Figure 3. If there is any considerable buckling of the pipe in the hole when slacked off, the slope will change as the slack is taken up, but will become straight when true elastic strain commences. The slope of the straight part of the curve above this point gives the relationship between the tension and the elastic strain, and the free length of pipe in the hole may be determined by a modification of equation (1) as follows, for the case shown in Figure 3:

$$L = \frac{E \times A \times (e_n - e_2)}{12(T_n - T_2)}$$

or

$$L = \frac{E \times w \times (e_n - e_2)}{40.8(T_n - T_2)}$$

Referring to Figure 3, $e_n - e_0$ represents the amount of slack.

Second Method

With the second method no weight indicator is required, and it is not necessary to know the value of "E." It depends upon the following principle. Let two unequal

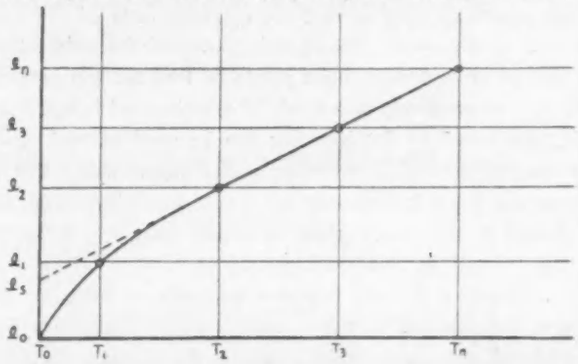

FIGURE 3

lengths, "L-1" and "L-2," be marked off on a homogeneous test piece (Figure 4). If the longitudinal tension is increased without exceeding the elastic limit, the strains in the two lengths will be proportional to their lengths. If "e-1" be the change in length caused by the change in stress in "L-1," and "e-2" the change in "L-2," then:

$$\frac{e_1}{e_2} = \frac{L_1}{L_2}$$

and

$$L_2 = L_1 \times \frac{e_2}{e_1} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

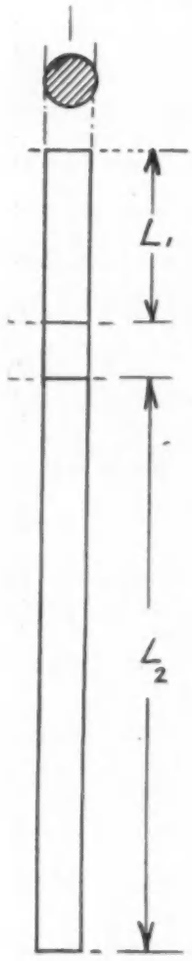

FIGURE 4

Applying this method to our problem:—an extensometer is applied to a length of the pipe above the top of the hole. A pull is taken in the column to take the slack out of it and the extensometer read. The tension in the pipe is then increased and the extensometer again read. At the same time the stretch of the pipe in the hole is measured. Knowing the length, "L-1," of the pipe between the extensometer clamps, the stretch, "e-1," caused by the increased tension, and the stretch, "e-2," of the pipe in the hole, we can calculate the free length, "L-2," by equation (2).

A suitable extensometer is not usually available at the rig, but one can be improvised in the following manner with materials and tools to be found in any oil field:

Select a joint of pipe between 30 and 40 feet long (Figure 5). Spot weld or clamp one end of an old sucker rod to this pipe about three feet below the collar, so that when the pipe is hanging on the elevators the welded end of the rod will be about two feet below the bottom of the elevators. Cut the rod to such a length that when the pipe is stabbed, the lower end will be four to five feet above the floor, and permit the tongues to be used on the pipe to set the pipe up. Cut another piece, "B," of the rod to such a length that when it is stood upon the collar into which the joint of pipe has been screwed there will be a gap between the ends of the two rods, "A" and "B" of three to six inches. Bind with cord or wire the lower end of rod "B" to the pipe, so that it will remain in place. Drill holes in two pieces of wood, "C" and "D," so that they will slip over the rods, and lash to the pipe with cord so that the opposing ends of the rods are held in alignment. The opposing ends of the rods should be filed or ground to rounded points so that the gap between them can be accurately measured. If a sucker rod is not available, any round or flat iron bar can be used instead. Borrow an internal micrometer or a dial gage. These instruments are used for measuring engine cylinders, and can be found in any work shop or repair garage.

Take a pull in the column of pipe, and measure with the micrometer the gap between the ends of the rods. Increase the tension in the column to the maximum pull considered safe, and again measure the distance between the ends of the rods. At the same time, measure the stretch in the whole column caused by the above change in tension:

Let L-1 = the distance in feet between the weld at the upper end of rod "A," and the contact between the lower end of rod "B" and the casing collar.

L-2 = the free length of the column in the hole in feet.

e-1 = the difference between the two micrometer readings in inches.

e-2 = the stretch of the pipe in the hole in inches.

Then:

$$L_2 = L_1 \times \frac{e_2}{e_1}.$$

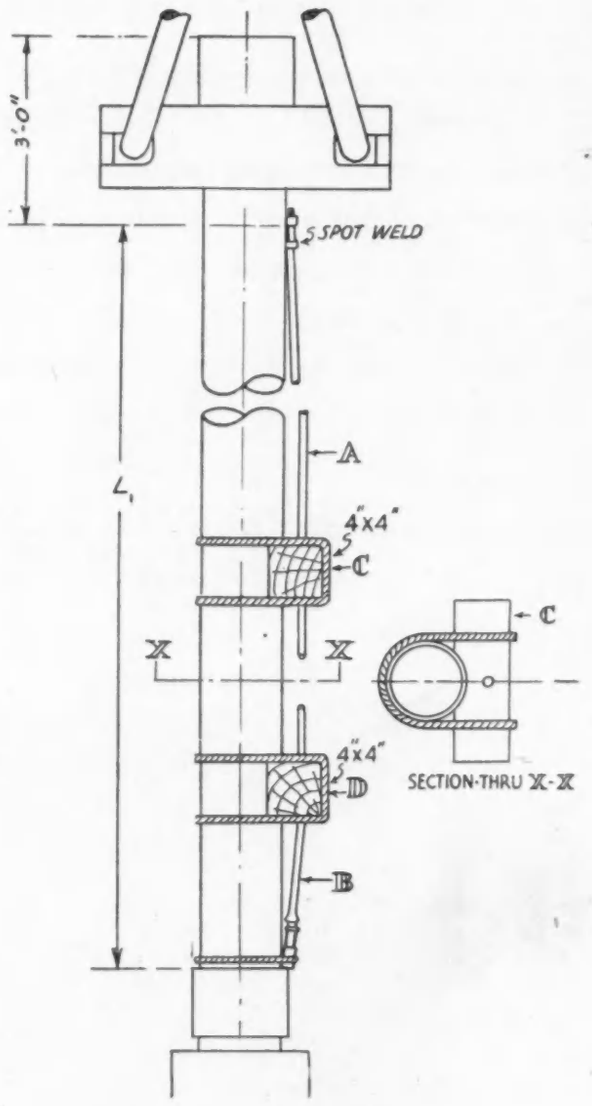

FIGURE 5

Regarding the probable accuracy of this method, assume that "L-1" equals 30 feet, and that the stress in the pipe has been changed by 10,000 pounds per square inch. Then the difference between the micrometer readings will be roughly 0.12 inch; and, since the micrometer can be read correctly to plus or minus 0.001 inch, the error should not exceed plus or minus 1 percent.

If it is desired to avoid errors due to friction in the

Patent Notice

Inasmuch as oil geologists and engineers are becoming increasingly familiar with the theory and scope of *Electrical Resistivity and Porosity Measurements,* and, as well surveys of this type are being widely adopted as a regular procedure supplementing oil exploration and exploitation,

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desires hereby to bring to the attention of the oil fraternity that it is operating under the protection of the following patents:

U. S. Patent No. 1,819,923
U. S. Patent No. 1,894,328
U. S. Patent No. 1,913,293
U. S. Patent No. 1,970,342

which cover the technique now in use, as evidenced particularly by the following claims:

"Patent 1,819,923 — Claim 1.

"An electrical process for determining the nature of the geological formations traversed by drill holes and which consists in measuring the electrical specific resistivity of the formations encountered at different depths inside the drill hole, where said hole contains water."

"Patent 1,913,293 — Claim 1.

"An electrical process for the geological investigation of the porous strata traversed by a drill hole, consisting in filling the hole with water or mud, and measuring in this fluid at various depths, in the uncased part of the hole the differences of potential which spontaneously take place at the contact between the porous strata and said fluid."

"Patent 1,970,342 — Claim 1.

"The method of determining the degree of salinity of the water contained in a porous stratum encountered by a bore hole, which consists in measuring in a mud of a given salinity filling the bore hole the electromotive force of the concentration element constituted by the water in the stratum, the mud in the bore hole and the surrounding rocks, and then repeating the said measurements with a mud of a different salinity in the bore hole."

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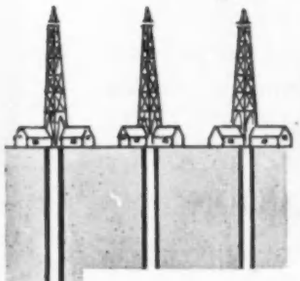

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hole, the procedure can be slightly modified as follows:

Make two marks on the column of pipe, corresponding to the stretch caused by the two applied tensions. Pull up to one of these marks, and measure the gap between the rod ends. Slack off to the same mark, and again measure the gap. Repeat these operations at the other mark, and use the difference between the arithmetic means of the two pairs of micrometer readings in the equation.

Both methods 1 and 2 can easily be extended to cases where there are two or more sizes and weights of pipe in the hole. The stress changes being known, the stretches in each group of one size and weight can be calculated and, commencing from the top, added until a total equal to the observed total stretch is obtained.

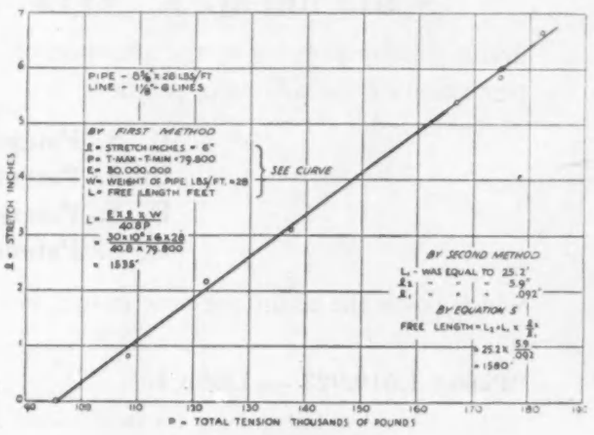
PIPE - 6⅝" x 28 LBS/FT
LINE - 1⅛"-6 LINES
BY FIRST METHOD
E = STRETCH INCHES = 6"
P = T-MAX - T-MIN = 79,800
E = 30,000,000
W = WEIGHT OF PIPE LBS/FT. = 28
L = FREE LENGTH FEET
SEE CURVE
BY SECOND METHOD
BY EQUATION 5
FREE LENGTH = 25.2 x 59/.092 = 1580'
E = STRETCH INCHES
P = TOTAL TENSION THOUSANDS OF POUNDS

FIGURE 6

In Figure 6, the results obtained in a recent test, in which the above two methods were checked against each other, are shown. With the first method, the free length worked out to 1535 feet; and with the second, 1580 feet—the difference between the two being less than 3 percent.

Third Method

Procedure of the third method would be similar to that described under method 2—with the difference that a torsion would be applied to the pipe instead of a pull, and the resulting twists measured. Some form of torsion meter would be applied to a length of the pipe above the ground, a moment applied to the pipe above it, and the angular twists produced in the pipe in the hole and in the length of pipe in the torsion meter measured. The free length could then be calculated with equation (2), using the angular distortions instead of the longitudinal strains.

This method would possess the advantage that, by alternately pulling and slacking off the pipe while maintaining the twisting movement in it, friction in the hole could be prevented from affecting the measurements. It has not, so far as the writer is aware, been used or worked out on a practical scale.

In conclusion, it may be mentioned that measurements upon cemented columns of casing made with the above methods indicate that, when using the pump-and-plug method of placing the cement, the cement comes up much higher than the height calculated by dividing the volume by the annular area. This must be due to channeling; and it is probable that, while a bond sufficient to hold the pipe is formed, shut off, or the prevention of circulation behind the pipe, is obtained only over a comparatively short distance.

Cementing Methods *for Excluding Water from* Producing Wells

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Humble Oil & Refining Company
San Antonio, Texas

THIS paper is presented as a supplement to previous papers in order to cover recent developments along the lines of oil-well cementing.

Three cementing methods have been developed and utilized successfully for plugging off water.

One method consists of plugging off bottom water in producing wells by means of an especially-designed tubing plug and placing the cement under pressure.

The second method pertains to under-reaming and cementing of oil-string casing to shut off water occurring only a few feet above the oil-producing horizon.

The third method is a refinement of the old "squeeze" job, and requires, first, ascertaining the pressure necessary to pump water into the formation being cemented, followed by the proper cement slurry under pressure.

This paper was presented at the Mid-Year meeting, American Petroleum Institute, Tulsa, Oklahoma, May 16, 1935.

THE plugging back of wells with cement is general practice; and in drilling wells, where the plugs are large, the placing of the cement by the equalized-column method has been uniformly successful. However, considerable difficulty has been encountered in accurately and effectively setting short (10 feet or less) cement plugs by this method; the preference previously had been for expanding lead or lead-wool plugs.

In the Salt Flat and Darst Creek fields at Caldwell and Guadalupe Counties, Texas, there has been developed a method of placing short cement plugs which, so far as the mechanical placing of the cement is concerned, is entirely satisfactory; and cement is now being generally used for plugging off water.

In the Edwards Lime fields considerable water has always been produced with the oil. This is due to the movement of the water up the fault-plane and into the reservoir from the high side of the structure. The problem of water disposal is an expensive and troublesome one; so that any reduction of the water-oil ratio is very much to be desired. By selective abandonment and systematic and continuous plugging back, the water percentage has been kept at its economic minimum.

The first method of placing the cement was that developed by the U. S. Bureau of Mines in the Powell field, and it has been used in the Salt Flat field until recently—when the present method was developed. The U. S. Bureau of Mines method included: 1, washing the well with a blank string of tubing until clean; 2, introduction of a wooden plug about two feet long into the tubing; 3, the spacing of the tubing about one foot from bottom; 4, pumping the mixed cement into the tubing, forcing the plug down; 5, pumping water on top of the cement until the plug—striking bottom—causes increase in pressure; 6, raising the tubing the requisite number of feet to be plugged, after corrections had been made for pump wash and distance tubing had been spaced from bottom; 7, washing excess cement from the well.

The equipment used in these operations included the following:

- 4½ × 10-in. power-driven pump
- 7 × 2½-in. blow-out preventer
- 2-in. rotary swivel and hose
- 1¾-sq. in. × 2-ft. wooden plug with fibre washer on top.

Considerable difficulty was encountered in catching the instant when the plug hit bottom, with the attendant possibility of washing the cement from the bottom of the well. Another difficulty was found in equalizing the cement in and outside of the tubing before pumping the excess cement from the hole. This resulted in poor plugs, and sometimes in plugs being very much smaller than intended. The low capacity of the pump would sometimes cause trouble by not being able to pump the cement satisfactorily out through the casing.

These difficulties led to the adoption of the new method, which is now being used.

The new method involves the use of a special plug consisting of two opposed swab cups on a mandrel and a seating shoe, at the bottom of a one-inch extension, to seat in the bull-plug coupling. Special "bottom connections" (illustrated in Figure 1), consisting of a perforated bull plug, collar with special valve seat for cementing plug, and a nine-inch working barrel, are placed on the bottom of the tubing. The top of the tubing string is equipped with a tee outlet and valve, as shown in Figure 1. Except for the material just described, the equipment for the two plugging methods is the same. The general arrangement of surface equipment is illustrated in Figure 2.

After the pumping equipment has been pulled, the bottom connections as shown in Figure 1 are run in on the tubing. The tubing is run to bottom, and the well washed through the perforated bull plug. When the well is cleaned, the cement is pumped in, the special plug placed in the tubing above the cement, and the cement and plug are pumped down with water. The pump will stop when the plug seats in the special collar, assuring that all the cement is outside the tubing. The tubing is then raised the required distance, and water is pumped into the casing—reversing the circulation and forcing the excess ce-

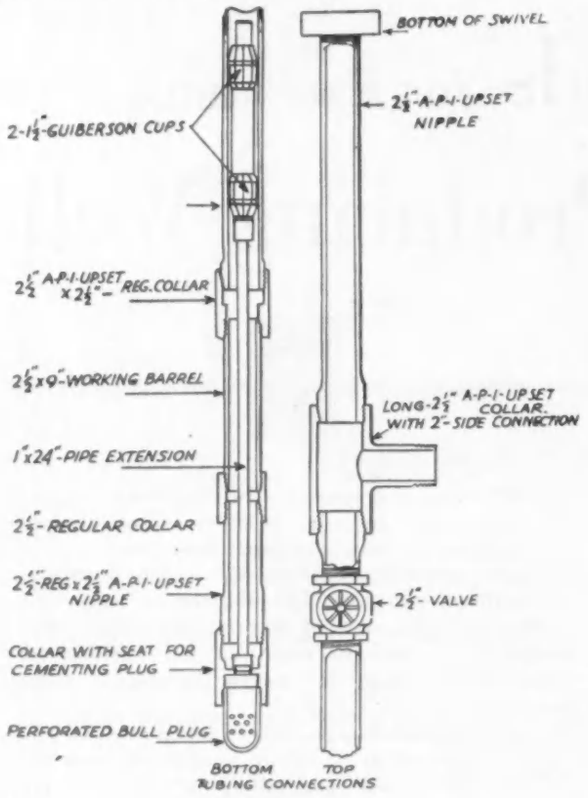

FIGURE 1

Cementing Plug and Tubing Connections for Placing Cement.

ment up through the tubing. The plug is recovered; and, after raising the tubing approximately 100 feet, the well is allowed to stand until the cement has set and hardened. An insert pump is then seated in the short section of working barrel (Figure 1), and a test of the well may be taken without pulling tubing. With the information obtained from the production test, it can be determined whether the plug is satisfactory. This saves two round-trips with the tubing.

The time required for preparing the well and mixing and placing the cement is six hours. The average cost of 32 jobs in the Darst Creek field was as follows:

Labor	$86.46
Truck and tractor	52.69
Cement	8.63
Power	2.00
Total average cost	$149.78

The decrease in water-oil ratio resulting from plugging back these wells is tabulated in Table 1.

The new plug method has the advantages of: 1, not requiring many calculations; 2, not requiring any measurement of volumes; 3, the accurate and positive placing of cement; and, 4, requiring less time than the old method.

As stated before, the plug method was developed in the lime fields of Darst Creek and Salt Flat, and has proved satisfactory there. In sand fields no trouble has been experienced in the mechanical placing of plugs, but the sealing off of water has not been satisfactorily effected.

Under-Reaming Method

The second method of excluding water from producing wells is concerned primarily with the completion of wells through a prolific water sand occurring above the oil sand and separated from it only by a few feet (10 to 20 feet) of shale. Such a condition gives only a few feet between these two sands in which to seal off the upper water. Ordinary methods of casing cementing have been found to be unsatisfactory in shutting off this water due to the fact that the casing hangs to one side of the hole, thus preventing the cement from completely surrounding the pipe in these few feet.

In order to get a good cement seal at the casing shoe, it is necessary that the cement completely surround the casing. This requires that the casing hang free and be nearly concentric with the hole. To accomplish this, the hole is under-reamed to a larger size from a point 25 feet or more above the casing seat down to the casing seat. The size of the under-reamed hole is usually sufficient to give at least three-inch clearance between the casing and the wall. The casing is then run and cemented in the regular manner. Figure 3 illustrates a typical casing-cementing job using this method to shut off upper water.

This method of cementing the oil-string casing has been

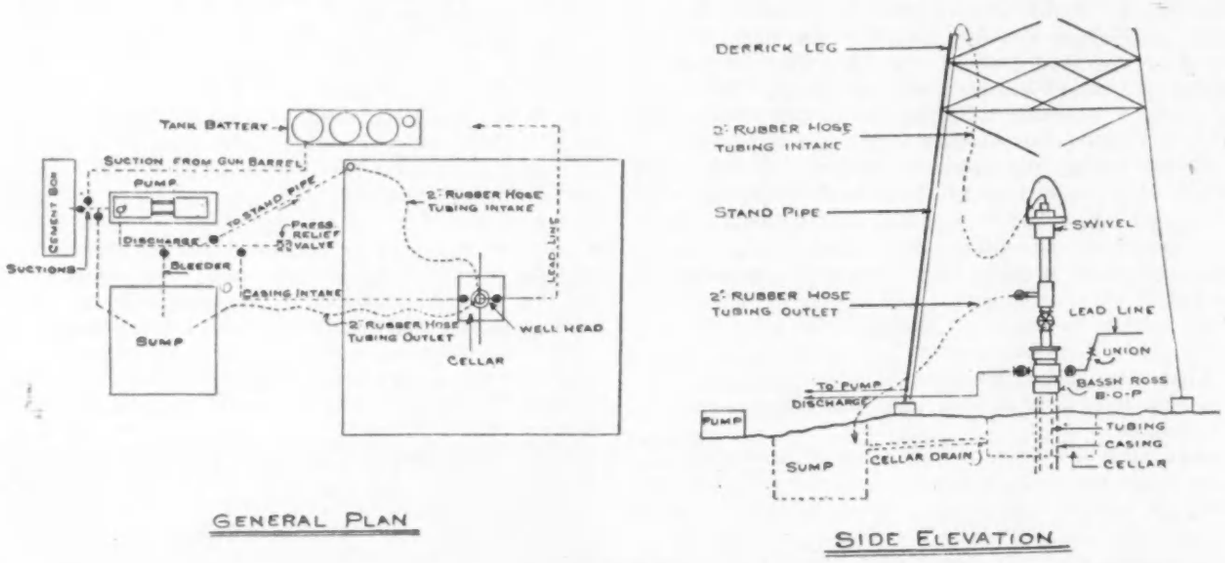

FIGURE 2

General Arrangement of Equipment for Cementing off Bottom Water, by Special Tubing-Plug Method

TABLE 1

Decrease in Water-Oil Ratio Resulting from Plugging Back Wells

	Before Plugging			After Plugging			Six Months After Plugging		
	Water	Oil	Water-Oil	Water	Oil	Water-Oil	Water	Oil	Water-Oil
Total	10,798	2,332	4.63	4,054	3,109	1.30	3,924	1,888	2.08
Average per well	490	106	...	184	141	...	196	94	...

used in a number of wells in a field that is troubled with this particular type of water condition, and has proved very effective in sealing off this upper water. The only additional cost of this method of cementing over the regular method is the rent of the under-reaming tool, and the rig rent for the time required in making one round-trip and

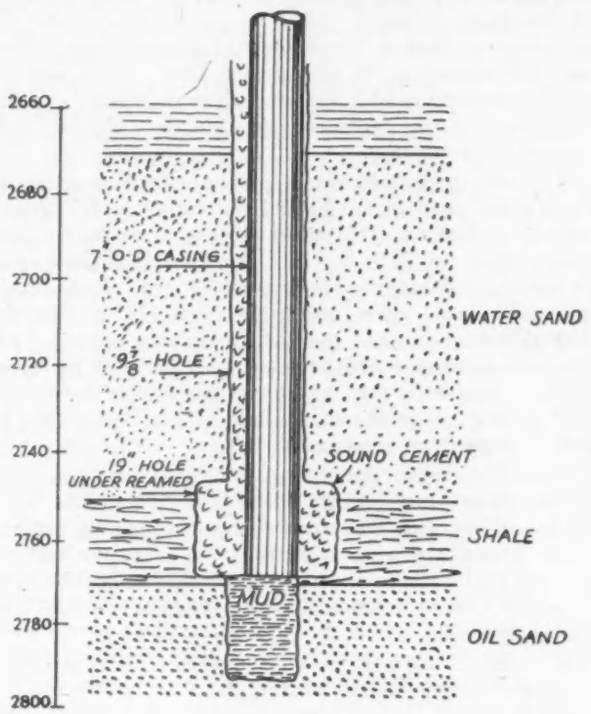

FIGURE 3

Diagrammatic Sketch Showing Under-reaming and Cementing of Casing to Exclude Upper Water

under-reaming. Ordinarily, where not more than 25 feet are under-reamed in the shale formation, only one set of blades is necessary. The relatively small cost of under-reaming is considered negligible compared with the added protection of the producing horizon obtained by this method of casing cementing.

While this method has been developed primarily for the exclusion of water occurring only a very few feet above an oil sand, it might be utilized for cementing all oil strings in order to obtain a better seal around the casing shoe—and possibly to exclude upper gas where the production of same is undesirable.

"Squeeze" Method

A refinement in the technique of the old "squeeze" method of excluding water from producing wells is also meeting with success in the Gulf Coast area. This method is particularly adapted to plugging off leaky casing and intermediate sands in a producing section which carries water. In using this method, it is assumed that a cement slurry of low viscosity when induced under pressure will follow the channels offering the least resistance, which should be the channels of the encroaching water. Two successful plug-back jobs using this method were recently completed in the Roanoke and Conroe fields, and are described hereinafter as Kratzer 1 and Jones 1 in order to illustrate the method.

Kratzer 1, Roanoke, Louisiana, originally was completed at a total depth of 8830 feet as a gas well, and produced for four months. It was decided to test an oil-bearing formation which had been cased off between 7780 and 7796 feet. Accordingly, the well was plugged back inside the seven-inch casing 7956 feet, and the casing perforated with 19 ⅜-inch holes from 7780 to 7796 feet. Screen and liner were set, and the well produced 532 barrels of fluid in 22 hours, showing 10 percent to 30 percent bottom sediment and water.

A study of an electrical survey taken prior to the original completion of the well indicated a salt water sand above the oil sand, from which the water was apparently entering. This was further confirmed by a survey made with a temperature instrument, which indicated the top of the cement behind the seven-inch casing at 7780 feet, thus effecting a shut off of water sands below the perforations. It was decided to attempt a squeeze job to cut off the water from this upper water sand. This particular job is illustrated in Figure 4.

The open-end drill pipe was run to 7796 feet, and a calculated amount of water pumped in to displace the mud

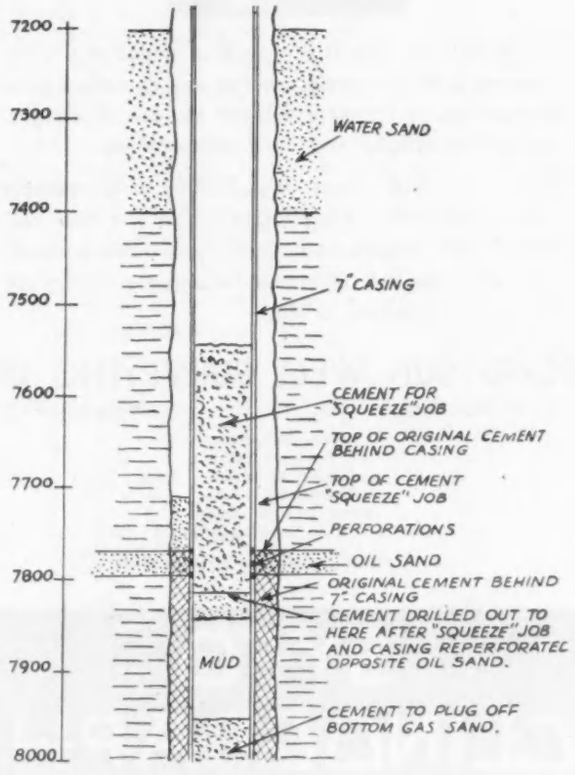

FIGURE 4

Diagrammatic Sketch of "Squeeze" Cement Job on Kratzer 1, Roanoke, Louisiana

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opposite the perforations. The drill pipe was set on the pack-off, and a pressure of 2700 pounds applied to the formation. At this pressure the formation started taking water, and a total of 42 barrels was pumped into the formation—the pressure increasing to 3400 pounds. The pack-off was removed from the drill pipe, and the drill pipe lowered to 7835 feet. A column of 14 pounds per gallon of cement slurry was then placed in the casing from 7835 to 7535 feet by the balanced-column method. The drill pipe was raised to 7465 feet, circulation reversed, and the excess cement washed out.

The drill pipe was again set on the pack-off, and a pressure of 2500 pounds applied to the cement. After pumping five minutes at this pressure, during which time about 2½ barrels of fluid was pumped into the well, the rubber on the pack-off failed. After the pack-off assembly was replaced, no attempt was made to "squeeze" more cement into the formation. A pressure of 1500 pounds was held on the cement for 12 hours, and after 38 hours the cement in the casing was drilled out to 7816 feet, (20 feet below the old perforations).

A second survey with the temperature instrument showed cement had been forced behind the casing to 7725 feet, or a total of 55 feet. This checked very close to the calculated height of 7727 feet for the cement, assuming 2½ barrels of cement had been pumped out of the casing. The casing was again perforated from 7780 to 7796 feet. Tubing was re-run and the well brought in again on April 10, 1935, producing 888 barrels of oil per day on ⅜-inch choke with 0.1 percent bottom sediment and water. The well is now producing at the rate of 526 barrels per day, and no water has appeared to date.

Jones 1, Conroe, Texas, was completed at a total depth of 5139 feet in May, 1933. Water first appeared in March, 1934, and the well died from water flooding in February, 1935. Screen and liner were removed from the well, and an electrical survey made of the producing section which indicated water was entering from sands between 5139 and 5080 feet.

A "squeeze" cement job was made on this well in much the same manner as on Kratzer 1.

The tubing was run to bottom, and the mud displaced with water to the point where it was desired to place the top of the plug—thus leaving mud on the face of the sand not intended to be plugged. The tubing was packed off, and 140 barrels of water pumped into the sand. The injection pressure started at the 900-pound pressure, building up to 1125 pounds. This was followed by 100 sacks of cement (14.0 pounds per gallon of slurry) which was pumped down to within 40 feet of the bottom of the tubing as measured by volume displacement. No cementing plug was used above the cement. It is estimated that about 80 sacks of cement were pumped into the water-producing sand, the other 20 sacks being left in the hole.

The tubing was pulled up and cleared of cement. After four hours the tubing was lowered, and the top of the cement found at 5064 feet. This was drilled out to 5075 feet, the desired height of the plug. The cement plug was allowed to set 72 hours before the screen and liner were re-run and the well tested.

On April 2, 1935, the well was flowing at the rate of 50 barrels per hour through ½-inch choke, showing 50 percent water. The percentage of water steadily decreased until the well made its daily allowable of 60 barrels of oil with no water. Recently the well has shown as much as 15 percent water, but this has been attributed to water being produced from oil sands flooded prior to the squeeze job, and should eventually disappear.

Formation Volume and Viscosity Studies *for Dominguez Field*

A Contribution from Research Project 37 of the American Petroleum Institute, Presented at Mid-Year Meeting, Division of Production, Tulsa, Oklahoma, May 15, 1935.

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ACKNOWLEDGE of the volume occupied by oil and gas under the conditions existing in the sands of producing oil pools has a number of possible applications in connection with the major problems facing the production engineer. Notable examples of such problems are those of estimation of reserves underground and of proration of the production from different properties in the same pool. The viscosity of the liquid phase, under the conditions prevailing in the sands, has important bearing upon the mobility of the oil toward the well. Experimental studies related to these subjects are here presented for the case of oil and gas from Dominguez field in California.

The term "formation volume" as used in this paper refers to the volume in cubic feet occupied by one cubic foot of oil (as measured at the surface at 60° F. and 14.73 pounds per square inch absolute) and the corresponding amount of gas to give a specified gas-oil ratio, when they have been brought to equilibrium at a specified temperature and pressure. Gas-oil ratios are given in terms of the cubic feet of gas associated with one barrel of oil, both the gas and the oil being measured at 60° F. and 14.73 pounds per square inch absolute.*

The ranges of equilibrium temperatures and pressures used in the study were chosen to cover those most likely to be met in producing sands. The temperature has been varied from 70° F. to 200° F. while equilibrium pressures from 400 to 3000 pounds per square inch were used. The range of gas-oil ratios covered lies between 0 and 10,000 cubic feet per barrel.

The samples of oil and gas used for the investigation were obtained from the surface traps of a well producing from the fifth Callendar zone. Gas samples were obtained from both the high-pressure and atmospheric traps and were then blended in the same proportion as produced to give a composite sample corresponding to the total gas production at the well at the time of sampling. The production gas-oil ratio was approximately 1400 cubic feet per barrel for the well as sampled.

*All pressures given are absolute.
†Specific gravity, as here used, is the ratio of the mass of a unit volume of the material under specified conditions to the mass of the same volume of water at its maximum density for atmospheric pressure.

TABLE 1
Analysis of Blended Gas Sample

Constituent	Mol. Percent	Calc. Gasoline Content gals MCF
Air	1.50	....
Carbon dioxide	0.60	....
Methane	87.78	....
Ethane	3.82	....
Propane	3.36	....
Iso-butane	0.74	....
n-Butane	1.26	0.396
Iso-pentane	0.38	0.138
n-Pentane	0.26	0.094
Residue (as n-hexane)	0.80	0.122
Total	100.0	0.750

TABLE 2
Properties of Oil Sample

Gravity, °API at 60°F	33.9
Flash point, °F	below 80
Pour point, °F	10.
Viscosity, Say. Univ. at 100°F., sec.	42.
Water and sediment by centrifuge, % by volume	0.1

The results of a low-temperature fractionation analysis of the blended gas sample are shown in Table 1, while some of the properties of the oil sample are listed in Table 2. Figure 1 gives a summary of the results of an analytical distillation made upon the oil sample, showing the variation of average molecular weight, viscosity, cumulative mass fraction and specific gravity† as functions of the average boiling points of the fractions obtained from the crude oil. The average boiling points were obtained from Engler distillations of each of the fractions. The analytical distillation of the crude oil was stopped at a still temperature of 650° F., the residue amounting to 32.4 mass percent of the original sample and having an average molecular weight of 603, a specific gravity of 0.974, and a viscosity of 532 Saybolt Furol seconds at 210° F.

The methods and apparatus used in determination of the relation of the volume of the various mixtures of oil and gas

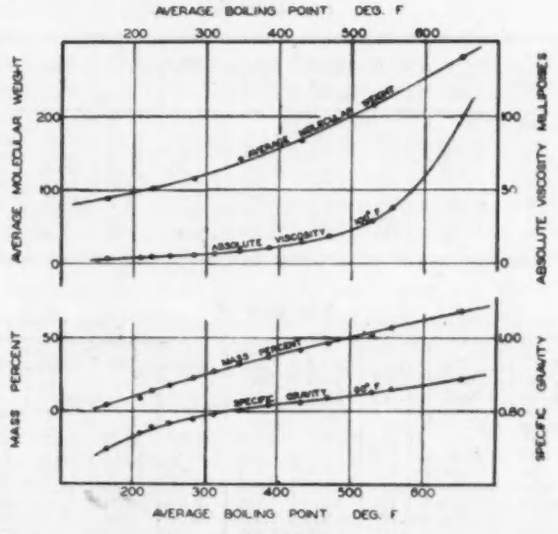

FIGURE 1
Results from Analytical Distillation of the Crude Oil

TABLE 3
FORMATION VOLUMES

For 70° F.

G. O.....	0	199.4	352.5	728.2	1368.6	3470	6648	10,000
Sat. Press.	10	904	1518	2459	.....	.....	.....	.....
Sat. Oil...	1.004	1.082	1.140	1.312	.....	.....	.....	.....
Pressure								
400	.....	1.684	2.542	4.463	7.985	21.10	40.92	61.88
600	.9997	1.309	1.865	3.089	5.548	13.84	27.49	41.12
1000	.9966	1.081	1.347	2.068	3.424	8.099	15.78	23.35
1500	.9939	1.078	1.146	1.579	2.424	5.386	9.967	14.66
2000	.9918	1.074	1.135	1.384	1.998	4.222	7.749	11.12
2500	.9892	1.071	1.131	1.311	1.769	3.583	6.389	9.105
3000	.9863	1.068	1.127	1.297	1.666	3.251	5.692	7.947

For 100° F.

G. O.....	0	199.4	352.5	728.2	1368.6	3470	6648	10,000
Sat. Press.	17	976	1645	2601	.....	.....	.....	....
Sat. Oil...	1.016	1.099	1.159	1.335	.....	.....	.....	.....
Pressure								
400	.....	1.804	2.745	4.837	9.00	22.95	44.05	66.34
600	1.011	1.390	1.998	3.341	6.011	15.03	29.34	43.67
1000	1.008	1.099	1.422	2.229	3.702	8.859	17.06	25.22
1500	1.005	1.095	1.188	1.683	2.672	5.891	11.03	16.23
2000	1.002	1.090	1.154	1.457	2.142	4.567	8.481	12.36
2500	.9991	1.086	1.149	1.348	1.886	3.865	6.972	10.13
3000	.9966	1.083	1.145	1.323	1.754	3.532	6.229	8.946

For 130° F.

G. O.....	0	199.4	352.5	728.2	1368.6	3470	6648	10,000
Sat. Press.	26	1047	1750	2728	.....	.....	.....	.....
Sat. Oil...	1.029	1.118	1.177	1.359	.....	.....	.....	.....
Pressure								
400	.....	1.923	2.946	5.212	9.88	24.78	47.32	70.85
600	1.024	1.472	2.130	3.592	6.483	16.23	31.20	46.83
1000	1.020	1.142	1.498	2.378	3.980	9.611	18.37	28.86
1500	1.017	1.112	1.234	1.786	2.813	6.397	12.09	18.21
2000	1.014	1.107	1.174	1.528	2.285	4.913	9.213	13.42
2500	1.010	1.103	1.169	1.396	1.998	4.14	7.589	11.19
3000	1.008	1.099	1.164	1.349	1.841	3.62	6.778	9.828

For 160° F.

G. O.....	0	199.4	352.5	728.2	1368.6	3470	6648	10,000
Sat. Press.	35	1115	1838	2853	.....	.....	.....	.....
Sat. Oil...	1.043	1.136	1.198	1.384	.....	.....	.....	.....
Pressure								
400	.....	2.044	3.149	5.587	10.56	26.55	50.68	75.34
600	1.038	1.550	2.262	3.843	6.943	17.37	33.07	49.61
1000	1.035	1.187	1.576	2.525	4.260	10.35	19.65	29.30
1500	1.031	1.131	1.283	1.884	3.009	6.898	13.16	19.45
2000	1.027	1.125	1.195	1.600	2.442	5.291	9.955	14.76
2500	1.023	1.120	1.189	1.447	2.115	4.431	8.195	12.12
3000	1.020	1.116	1.183	1.377	1.929	4.022	7.315	10.57

For 190° F.

G. O.....	0	199.4	352.5	728.2	1368.6	3470	6648	10,000
Sat. Press.	45	1177	1917	2974	.....	.....	.....	.....
Sat. Oil...	1.059	1.155	1.218	1.413	.....	.....	.....	.....
Pressure								
400	.....	2.165	3.352	5.959	11.01	27.75	53.09	79.83
600	1.054	1.634	2.394	4.089	7.08	18.19	34.65	51.92
1000	1.050	1.234	1.654	2.661	4.536	11.13	20.94	31.19
1500	1.045	1.150	1.336	1.982	3.208	7.404	13.88	20.71
2000	1.041	1.144	1.217	1.673	2.572	5.72	10.69	15.92
2500	1.037	1.138	1.210	1.502	2.232	4.74	8.778	12.87
3000	1.033	1.133	1.203	1.409	2.019	4.27	7.864	11.58

For 220° F.

G. O.....	0	199.4	352.5	728.2	1368.6	3470	6648	10,000
Sat. Press.	58	1229	1995	3096	.....	.....	.....	.....
Sat. Oil...	1.077	1.174	1.239	1.450	.....	.....	.....	.....
Pressure								
400	.....	2.283	3.555	6.334	11.96	30.33	56.99	84.39
600	1.070	1.715	2.525	4.345	8.025	19.81	37.17	55.22
1000	1.066	1.279	1.735	2.808	4.814	11.87	22.22	32.92
1500	1.061	1.170	1.395	2.084	3.339	7.909	15.28	22.60
2000	1.056	1.162	1.239	1.746	2.714	6.015	11.43	16.94
2500	1.052	1.156	1.228	1.559	2.349	5.165	9.395	13.78
3000	1.047	1.150	1.219	1.461	2.108	4.639	8.412	12.20

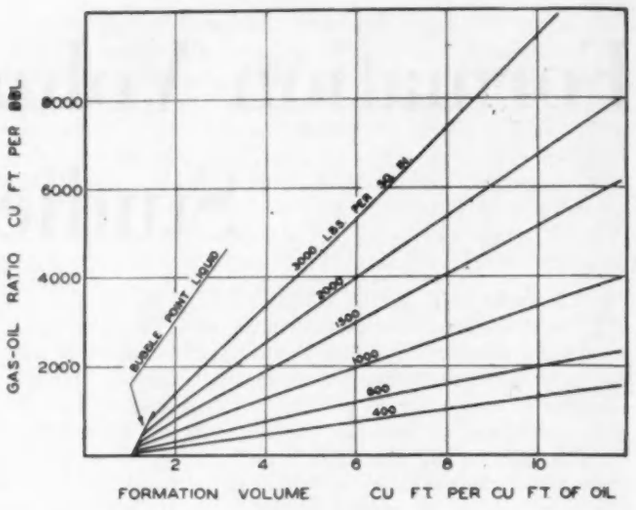

FIGURE 2
Formation Volumes at 160° F.

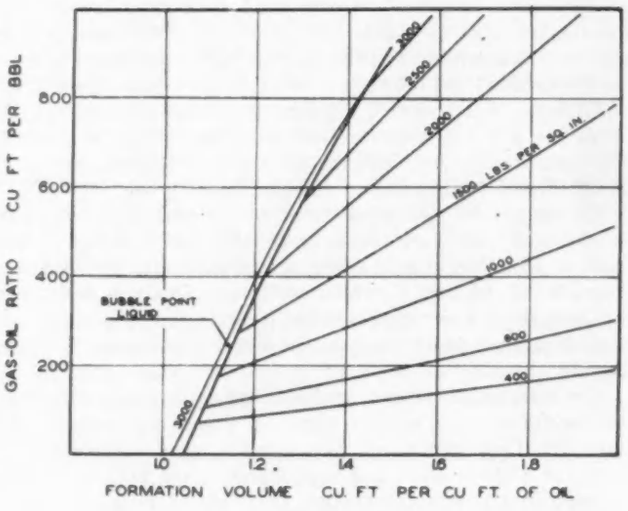

FIGURE 3
Formation Volumes at 160°F. for Low Gas-Oil Ratios

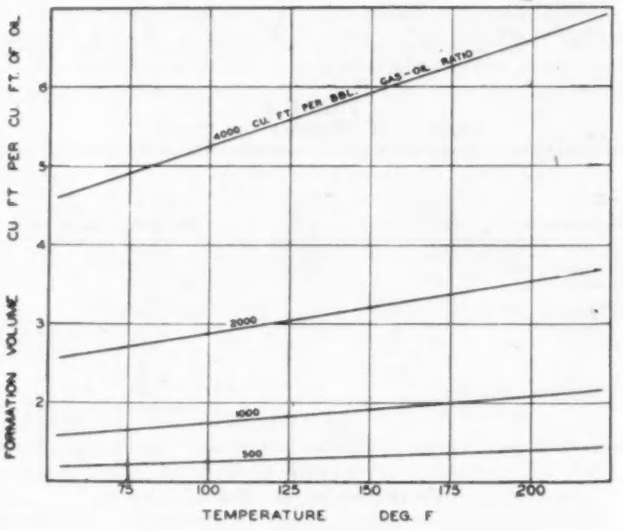

FIGURE 4
Effect of Temperature upon Formation Volume at a pressure of 2,000 pounds per square inch

TABLE 4

Gas-Oil Ratios and Formation Volumes for Bubble Point Liquid

G.O., Gas-Oil Ratio **F.V., Formation Volume**

Pressure Lbs. Per Sq. In.	70° F.		100° F.		130° F.		160° F.		190° F.		220° F.	
	G. O.	F. V.	G. O.	F. V.	G. O.	F. V.	G. O.	F. V.	G. O.	F. V.	G. O.	F. V.
400	84.5	1.036	76.5	1.049	68.0	1.062	65.3	1.075	56.1	1.088	54.0	1.10
600	128.2	1.053	117.3	1.066	105.8	1.077	102.2	1.090	91.3	1.104	87.3	1.11
1000	219.3	1.090	201.7	1.101	186.5	1.111	176.8	1.124	164.9	1.138	156.9	1.15
1500	347.2	1.139	319.3	1.145	295.5	1.156	276.3	1.167	263.8	1.181	251.9	1.19
2000	511.4	1.207	463.9	1.204	423.0	1.209	396.1	1.218	376.5	1.231	357.2	1.24
2500	750.9	1.322	668.9	1.304	605.0	1.296	559.8	1.297	525.5	1.303	492.3	1.31
3000	1100.	1.51	971.9	1.48	875.5	1.45	816.3	1.43	737.2	1.42	682.8	1.42

to pressure and temperature have been described in detail elsewhere [1,2,3]. The oil was weighed into the apparatus and a measured amount of gas was added. The whole system was brought to a selected temperature and equilibrium was assured by mechanical agitation. The volume of the equilibrium mixture was systematically varied by addition or withdrawal of mercury, and was determined by ascertaining the position of the mercury level in the apparatus. After reaching equilibrium at each new volume the corresponding equilibrium pressure was determined. The temperatures were controlled well within 0.1° F., pressures being measured to one pound per square inch and volumes to 0.1 percent of the actual value.

Studies were made upon the crude oil itself, upon the natural gas, and upon six mixtures of oil and gas. The isothermal change in volume with pressure was measured for most of the mixtures at six evenly spaced temperatures from 70° F. to 200° F. Care was taken to obtain sufficient data in the neighborhood of the bubble point to establish the latter with certainty. The bubble point is that condition of the mixture at which the gas phase just appears or disappears as the pressure is decreased or increased. At this condition the sample is all liquid except for an infinitesimal amount of gas in equilibrium with it.

The results of over 1000 equilibrium measurements are summarized in Tables 3 and 4 and in Figures 2 to 6. In Table 3 will be found numerical data relating to the formation volumes at each of a series of temperatures. Each vertical column is for a given gas-oil ratio (G.O.) Under each gas-oil ratio for which the gas phase disappeared before a pressure of 3000 pounds per square inch was reached, the bubble point pressure (Sat. Press.) and the bubble point volume (Sat. Oil) is stated. All volumes given are in the units specified above in defining formation volume. Table 4 describes the properties of bubble point liquids, giving their gas-oil ratios and formation volumes for specified temperatures and pressures. These gas-oil ratios indicate the extent of solubility of the gas in the oil.

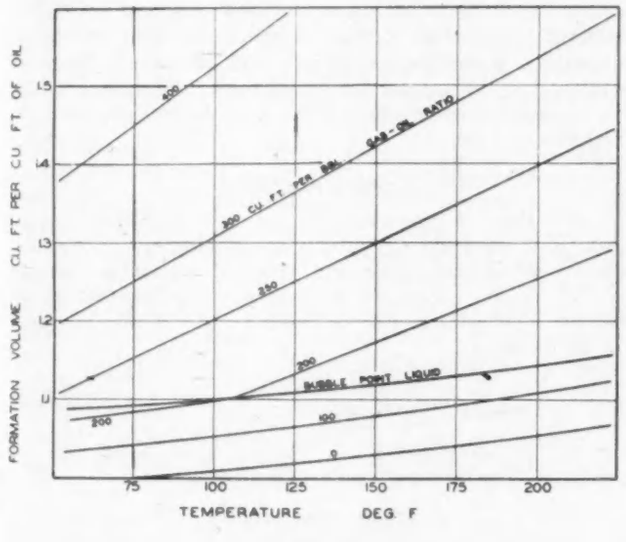

FIGURE 5

Effect of Temperature for Low Gas-Oil Ratios at a Pressure of 1,000 Pounds Per Square Inch

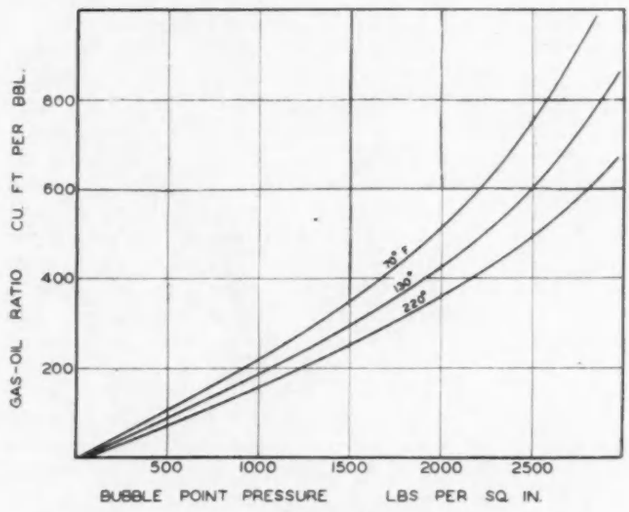

FIGURE 6

Solubility of Gas in the Oil

In order to render visualization of these results more easily accomplished they have been used as the basis for a series of graphs. These typical diagrams were chosen to illustrate some of the numerous possible ways in which the data might be presented. Figure 2 shows the formation volumes at 160° F. for specified gas-oil ratios and formation pressures. For example, if one is interested in a gas-oil ratio of 2000 cubic feet per barrel and an equilibrium pressure of 1500 pounds per square inch, it is found that the corresponding formation volume at 160° F. is 4.2 cubic feet for each cubic foot of oil as measured at the surface tanks (60.0° F. and 14.73 pounds per square inch). By obtaining the volume corresponding to the intersection of the 1500 pounds per square inch line with the bubble point liquid line, it is found that of this 4.2 cubic feet total volume, approximately 1.2 cubic feet would be occupied by liquid and the remaining 3.0 cubic feet by free gas. Figure 3 shows on a larger scale and in more detail the region of Figure 2 near the bubble point liquid curve. That portion of the 3000 pounds per square inch line lying to the left of the bubble point liquid line indicates the extent of compression of the liquid as the pressure is increased from bubble point pressure to 3000 pounds per square inch.

It must be realized that the division of the total formation

TABLE 5
Viscosity of Saturated Liquid Solutions of Gas in Oil
Absolute Viscosities millipoises

Pressure	100°F.	130°F.	160°F.	220°F.
V. P. of Oil	33.4	24.0	17.6	10.7
200	27.6	20.9	15.5	9.9
600	20.3	16.2	12.4	8.6
1000	15.7	13.0	10.4	7.6
1500	11.8	10.3	8.7	6.6
2000	9.4	8.5	7.3	5.8
3000	7.3	6.5	5.6	4.9

volume between liquid and gas phases, as indicated above, was at best only an approximation. The volume of 1.2 cubic feet was that of bubble point liquid (with no appreciable gas phase present) while in the case chosen there was evidently a large amount of free gas present. Under these conditions the volume of the liquid phase would be smaller due to transfer of some of the materials which were liquid at bubble point into the free gas space. This effect is small at low temperatures and pressures but may become very important at high temperatures and pressures with large volumes of free gas present. In any case, the volume of liquid obtained by the approximation method of the previous paragraph is a maximum value.

The effect of temperature upon formation volume at a constant pressure of 2000 pounds per square inch is shown in Figure 4 for four different gas-oil ratios. Figure 5 is a similar plot for 1000 pounds per square inch and low gas-oil ratios, a much enlarged scale being used. The curves lying below the curve for the bubble point liquid show the isobaric variation of condensed liquid volume with temperature, the gas-oil ratio being below that required for saturation at 1000 pounds per square inch and a given temperature. The bubble point curves of Figure 6 show the solubility of the gas in the oil sample as a function of pressure for three different temperatures. The more rapid increase of solubility (as expressed in terms of bubble point gas-oil ratio) with increase of pressure at the higher pressure is due to approach to the critical state.

As stated earlier, measurements have been made upon the viscosities of the liquid phases of various equilibrium mixtures of this same gas and oil throughout the same temperature and pressure ranges as were used in the formation volume studies. The results are shown in three different forms in Table 5 and Figures 7 and 8. The values of Table 5 are believed to be reliable within 2 percent except those values which are less than six millipoises whose uncertainty is somewhat greater.

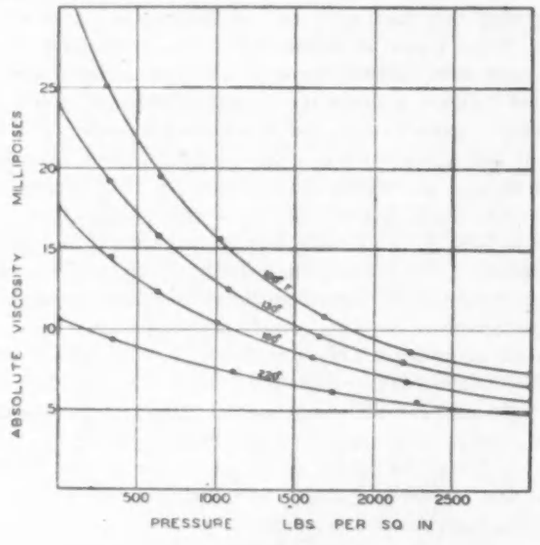

FIGURE 7
Viscosity of Liquid as a Function of Saturation Pressure

Figure 7 shows the variation of the viscosity of the saturated liquid solution of the gas in the oil as a function of equilibrium pressure for a series of different temperatures. Figure 8 shows similar variation as a function of temperature for a series of pressures. In the latter figure, the inversion in curvature at a temperature of about 150° F. is due to the fact that the decrease in viscosity results from two independent effects. One is the decrease of viscosity of the liquid due to change in temperature alone. The other is the decrease due to the presence of dissolved gas in the oil. Since the solubility of gas decreases with increasing temperature the two effects

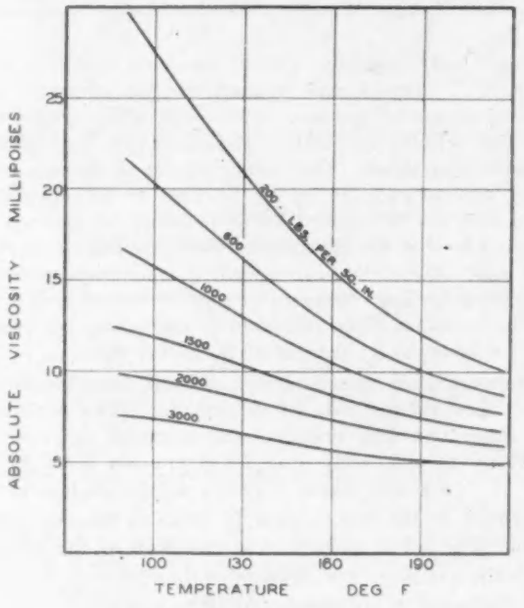

FIGURE 8
Viscosity of Saturated Liquid as Related to Temperature

tend to partially counterbalance each other, more particularly in the temperature region cited.

The information regarding formation volumes, as here presented, applies only to the samples of oil and gas used in the experimental study. It is desirable that such work be extended to ascertain the effect of variation of the composition of the samples of oil and gas. In the meantime, however, the authors believe, on the basis of experience with mixtures of widely different composition [4,5] that the effect of minor change of composition is relatively small when the mixture is far from bubble point. When near the bubble point the larger effect of gas composition upon solubility has a marked effect upon the formation volume.

Acknowledgments

Appreciation is expressed for the helpful cooperation of Union Oil Company of California, including furnishing the samples and accompanying field data and the analyses of gas and of the oil, except the molecular weight determinations. Thanks are due especially to Howard Pyle of that company for his assistance.

The American Petroleum Institute has contributed active cooperation and financial assistance to make this study possible.

J. E. Sherborne and D. C. Webster have assisted in the laboratory and drafting work, respectively.

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Drill Stem . . .

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Hughes Tool Company

EARLY rotary wells were drilled with low-carbon lap-welded drill stem; difficulties arising from cross threading, galling, rapid thread wear, and slow handling forced the development of the rotary tool joint—increasing loads encountered as well depths increased led to the introduction of medium carbon seamless drill pipe with heavy upset and special thread form together with heat treated alloy joints. Recent changes in drilling practice adopted to decrease deviation of hole from vertical have emphasized certain factors which cause type failures not previously general.

The apparently simple drill stem structure contains complicated design problems not susceptible of exact mathematical solution. The predominating type of failure is definitely fatigue, possibly accelerated by corrosion. Vibration, both torsional and transverse, is probably the principal destructive factor. Marked reduction of failures through metallurgical improvement is at present unlikely in the light of present knowledge. Some advantage may be secured through changes of design though only by sacrifice in other directions, at the present less important. Much can be accomplished by greater care in the use of drill stem with special attention to those factors influenced by light weight and high rotative speed.

This paper was first presented before the Spring Meeting of the Southwestern District of the American Petroleum Institute Division of Production, held at San Antonio, Texas, April 25-26, 1935, and again read before the Annual Mid-Year Meeting of the American Petroleum Institute Division of Production at Tulsa, May 14-16, 1935.

THE drill stem used with rotary rigs, from the first application of the rotary system to the drilling of oil wells in about 1900 to the introduction of the Whittier tool joint about 1910, consisted of low-carbon lap-welded line pipe joined with rather short couplings of a similar material. Wells were relatively shallow and the use of the rotary was limited to regions of unconsolidated formations, under which conditions fairly satisfactory performance was possible with a stem of this character.

The Whittier tool joint was developed in an effort to eliminate galling difficulties encountered in making up and breaking out the somewhat delicate pipe threads and to reduce the labor involved of screwing up the joint when going in the hole. Early tool joints were made of "machinery" steel unheat treated, and in spite of the coarser threads employed in the pin and box, still gave some trouble from galling. In addition, jumped pins were not uncommon and thread damage during stabbing was encountered. Some decrease in the galling difficulty was accomplished by cyaniding the threads of the pin, leaving the box threads soft.

The combination of the shoulder with the tapered thread, similar to the cable tool joint, very materially increased the difficulty of making interchangeable joints, and in an effort to solve this problem, the Hickman joint was introduced in North Texas and Louisiana. This joint consisted of a coarse threaded, steep tapered, pin and box but without a shoulder, and while readily interchangeable, gave so much trouble from galling that it was eventually abandoned.

The Acme form of thread was introduced for use in tool joints in 1918 and at the same time a heat treated alloy steel was used with much higher physical properties than formerly employed and less subject to galling. The Acme form of thread is well adapted to resist the impact resulting from stabbing the pin in the box and has a greater amount of metal available to resist wear above the pitch line than is the case with the V-thread.

As the use of the tool joint became more extensive, failures in the pipe end were encountered, and the practice of upsetting the end of the pipe to strengthen the section under the threads was established. This upset was at first only sufficient to replace the metal removed in threading, but stress concentration due to thread form continued to cause failure and the upset was finally thickened to about two and one-half times the wall thickness of the pipe. Thread form was also improved, the sharp bottom form of the Briggs system being abandoned in favor of a thread round at top and bottom but still retaining the 60° included angle. The fillets at the roots of these threads markedly reduced stress concentration though somewhat increasing the difficulty of manufacture, particularly in field shops.

As drilling reached greater depths, it became necessary to further strengthen the string, and the use of lap-welded material was abandoned in favor of pierced seamless tubing, which removed the necessity for using the low carbon stock required for welding, and permitted the use of 40 carbon material and higher with resulting increase in strength.

Design

The loading imposed on the drill stem in service consists of tension, compression, and torsion, together with flexure due to the long column effect or to crooked hole, flexure being particularly severe where cavities are encountered. Failures due to direct stress are, however, comparatively rare as is evidenced by the fact that in spite of the ductile character of the material in both pipe and tool joints fractures commonly have the appearance of brittle failure; that is, are the result of fatigue due to varying stress. The proportion in which these various loads are encountered varies from point to point in the string and changes from instant to instant depending

on the variation of direct loading and changes in the mode of vibration.

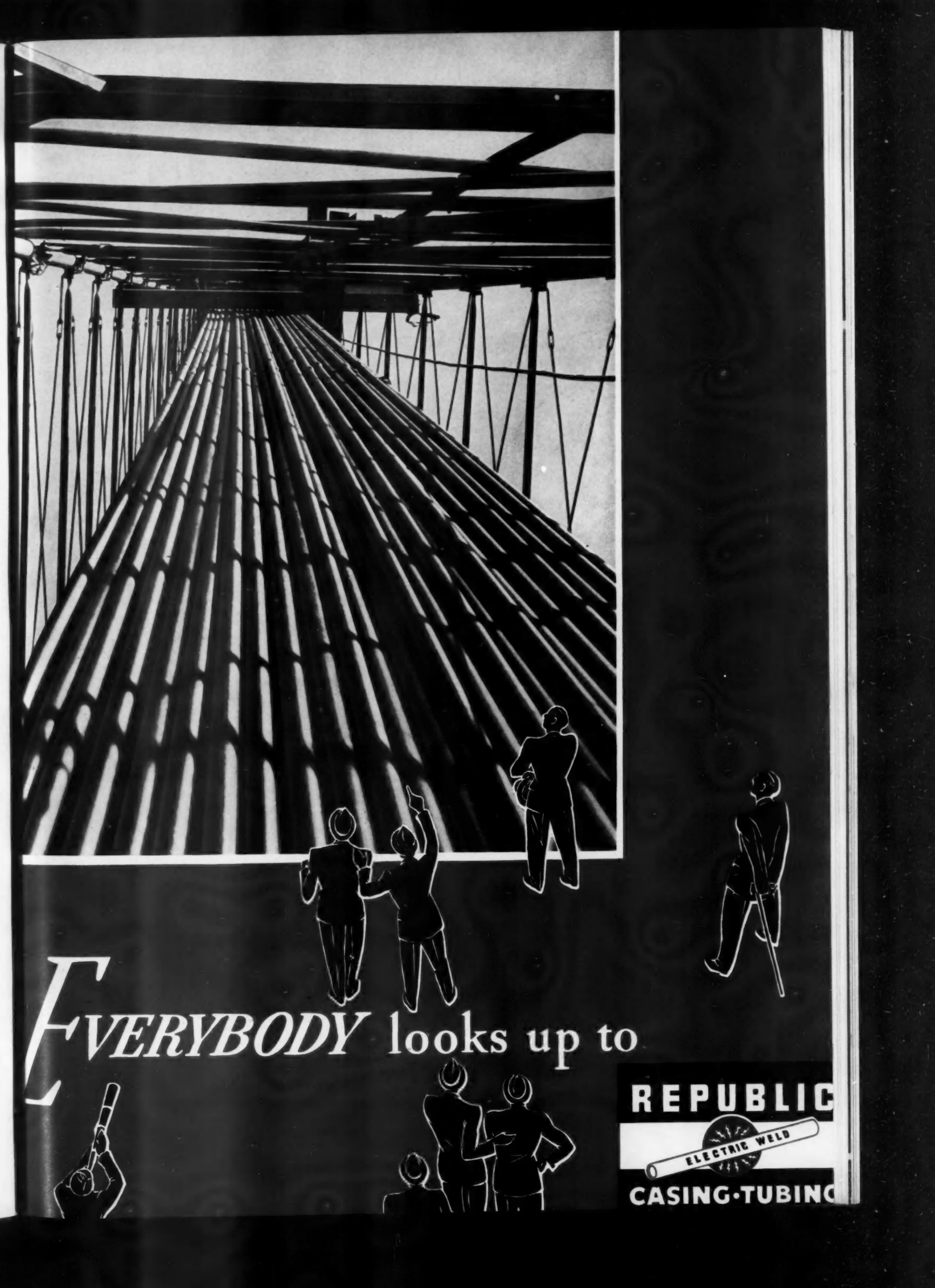
Passing by, for the moment, consideration of "live" loads, even a superficial consideration of the statics of the structure will uncover a surprising complexity in these apparently simple members.

Consider first the pipe end of the joint from the point of view that the taper threaded pipe is a mandrel designed to expand the pipe end of the tool joint. A simple calculation will show that the mechanical advantage of this device is in excess of 2600 to one. In other words, if a certain tangential force is applied to the O.D. of the pipe to cause it to make up in the tool joint, and in the absence of friction, the bursting force exerted on the tool joint will be 2600 times as great as the force applied. Since the joints do set up to a point where the pipe may be wrung off in torsion, it is apparent that very large tangential friction forces must be set up on the threads and that these forces will vary inversely as the coefficient of friction. In other words, the higher the coefficient of friction the less the stress required to set up the required torque resistance. Immediately the question arises, why then grease the threads liberally when making up, which obviously reduces the coefficient of friction and increases the stresses. The answer is, of course, the hazard of galling the surface if an attempt is made to assemble the joints without lubrication. On the other hand, it is evident that such a lubricant should be employed as will give the highest possible coefficient of friction with adequate protection against galling. Zinc-bearing lubricants possess these characteristics to a considerable degree, as there is a marked tendency for the grease to be expelled from the joint in make up, and for the zinc to be compressed into very thin sheets separating the steel surfaces, thereby preventing galling, but presenting reasonably high friction characteristics. While such a situation as described above is not entirely unexpected in view of the small taper and relatively fine thread employed on the pipe ends, it is somewhat of a surprise to find that even in the case of the pin and box, where the thread is relatively coarse and a rugged shoulder is provided to limit definitely the setting up of the joint, it is still the case that almost the entire torque is transmitted by friction. In this case we may conveniently consider the tool joint box as a device calculated to lift the pin off its shoulder by the reaction of shoulder contact. Using for illustration the six-inch A.P.I. joint with four threads per inch and a mean pin diameter of about 5½ inches, the mechanical advantage is nearly 70 to one, much less, to be sure, than in the case of the pipe end, but still sufficiently high so that with a coefficient of friction of 0.2, more than 95 percent of the torque transmitted is carried by friction on the threads and on the shoulders, and less than five percent as result of the direct mechanical reactions. Here the matter of lubrication is even more complicated as the threads are frequently made up and broken out, the grease inevitably carries sand, minute steel slivers, threads of soft rope, and other foreign material, and must withstand making up and breaking out at relatively high speed. Here again, a low coefficient of friction during make-up and break-out is desired to reduce the hazard of galling, and a high coefficient of friction is desired to reduce mechanical stresses and minimize the hazard of tool joint backing off in service. See Figure 9 for a case of failure due to low friction coefficient.

There is a second problem in statics of academic interest only due to the impossibility of working to the extremely close dimensions required, or of maintaining those dimensions under operating conditions, but nevertheless an interesting subject for speculation and possibly of some importance as affecting performance. Both pipe and tool joints are made of elastic materials. In tension loading, the threaded end of the pipe and the pipe end of the tool joint are both in tension, under which loading an elongation is produced in both members, depending on the intensity of stress. In other words, the two members tend in general to stretch together. This is not true of this joint in torsion, as the tangential effort required to resist the applied torque can only be furnished by an appreciable area of contacting surfaces and the elasticity of the materials will permit relative motion from the first engaged thread and down the length of the joint, to that point at which the sum of all thread forces equals the applied load. In other words, under varying torque the first few engaged threads at the big end of the taper will oscillate with respect to each other, which phenomenon may have some bearing on failure through the upset in the last engaged thread. A still more undesirable situation is encountered in the shouldered pin and box joint where the walls of the box are in axial compression due to the shoulder reaction, and the section of the pin is in tension for the same reason. In this case the tendency is to increase the thread lead of the pin and to decrease the thread lead of the box, thereby concentrating the load on those threads in the region of the base of the pin. A similar situation is encountered in studs and other common threaded connections, and in theory could be corrected, in part at least, by so varying the initial lead, as that uniform thread pressure would result under the deformation produced by the desired load. As stated above, this is not a practical solution inasmuch as the lead variations required from nominal to secure such a result lie beyond any practical manufacturing limits, and such close dimensions would inevitably be destroyed in a very short time under the severe conditions of abrasion encountered in tool joint operation. See A.S.M.E. (Applied Mechanics Section) paper APM-51-1, entitled "The Mechanics of Plate Rotors for Turbo-Generators," by J. P. Den Hartog, for a mathematical treatment of this subject, under Appendix No. 2.

Stress concentration is affected to a considerable degree by thread form, particularly in the pipe end where fatigue failures are most frequent. The adoption of the rounded crests and roots for drill pipe threads marked a considerable advance in design, as the notch effect is thereby very materially reduced and the hazard of fatigue failure thereby lessened. A small clearance is provided in the roots of both members to insure flank contact rather than crest to root contact, but small enough in amount to prevent leakage under the rather high box threads is also rounded, but a much larger clearance is drilling pressures now employed. The root of the pin and necessarily allowed, partly to further reduce galling hazards and also to accommodate the foreign material inevitably present in the grease. Pressure seal in the pin and box is secured through the shut-off at the shoulders, the thread form having little effect on the matter of leakage.

Both pipe end and pin and box ends must remain tight in service under a mud pressure often exceeding 1000 pounds per square inch. This high pressure is required partly to supply friction losses in transmission from the surface to the drill bit and in returning the mud fluid with the associated cuttings back to the surface, and also to provide the required jetting effect at the bit to keep the cutting edges clean and stir the removed material thoroughly into the mud to insure its removal in the returns. It is, of course, desirable to reduce the transmission losses to a minimum, thereby reducing the surface pressure required to provide a satisfactory jetting action. The pressure losses within the drill stem for a given character and quantity of mud flow are determined by the pipe size and the degree of constriction permitted at the tool joint. If the hole through the joint is smaller than the bore of the pipe, the mud velocity must necessarily increase as the fluid enters the pin and again decrease as it leaves. Pressure energy can be converted to kinetic energy with rather high efficiency and hence the entrance losses are of minor importance even with 200 or more orifices in the string. On the contrary, kinetic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energy can be converted efficiently to pressure energy only by the most careful design to eliminate shock, and in the limited space available in a tool joint practically all of the kinetic energy represented by the difference in velocity in the bore of the pin and in the bore of the pipe is lost at each joint. Since this energy loss is proportional to the square of the velocity, a 10 percent change in velocity involves a 20 percent loss in energy and considerable gains in this direction were effected by the introduction of the full hole tool joint.

Resistance to wear is an important character of both pipe and joints as the loss of metal results in reduced strength and ultimate certain failure. Reduction of the O.D. of the joint reduces the shoulder area and increases the hazard of failure by upsetting. Wear of the shoulder itself is apt to be non-uniform and to result in leakage and rapid destruction of the threads by mud cutting. Thread wear may reduce the thread engagement to a point where the joint is structurally unsafe to run, and abrasion on the body of the pipe between joints may so reduce the section as to cause the pipe to wring off under comparatively light loads. Greater resistance to abrasion can only be secured by increased scratch hardness, strength and toughness. Unfortunately, the first two factors can be secured in any given material only at the expense of the third, and the problem of deciding just how much toughness can be sacrificed in an attempt to increase hardness and strength without at the same time unduly increasing structural failures is a matter of some difficulty. That toughness in itself is of considerable importance in the matter of abrasion resistance is indicated by the relatively great resistance of rubber to this action, where the scratch hardness and strength is in no way comparable to the values encountered in even the milder grades of steel. In the past drilling conditions have been such that abrasive wear on the diameter usually determined the useful life of the tool joint, but there are at present indications that the change of method involved in the attempt to drill straighter hole has shifted the burden to the threads and shoulders of the tool joint.

Vibration is without doubt the immediate cause of the majority of drill stem failures, and is at the same time the least amenable to satisfactory analysis. Drill stem in a deep well is in effect a string under variable tension, indeed with some compression at the lower end, subjected to transverse and torsional vibrations set up both at the surface and at the bottom of the well, and damped to a greater or lesser degree by the mud in the hole and by contact with the walls where such contact occurs. In addition there are undoubtedly axial vibrations of much higher frequency than the foregoing but probably of relatively low intensity and with very small amplitude. The tool joint connections in this string provide undesirable mass concentrations which intensify the stresses set up by these vibrations, particularly in the case of transverse vibration. Difficulties in calculation arise from the fact that the tension is variable, contact with the wall is indeterminate, the frequency of the applied impulses changes, and the degree of damping can hardly be estimated with any reasonable accuracy. For the present, at least, it seems that we must rely on accumulated past experience with related phenomena to suggest methods of combating the failures now encountered.

Gaging and Interchangeability

The fundamental purpose of gaging any product is to control the mating fit of cooperating parts within limits that insure satisfactory performance. This is especially vital with respect to the threads on drill pipe and tool joints since facilities are not available on the job for correction of errors, and failure is apt to cause a loss out of all proportion to the intrinsic value of the parts involved.

Note that the fit of the product to the gage is of no importance whatever except in so far as the acceptance or rejection of the work by the gage controls the variation of mating fit of the product. The attainment of this objective obviously involves the provision of such a gaging system as will predict mating fit from gage data. This is a comparatively simple matter where single dimensions only are involved such as, for instance, the control of diametrical clearance on an automobile wrist pin in the piston bosses. Where groups of dimensions must be measured simultaneously as in the case of straight threads and where the gage fit depends on lead and thread form as well as on diameter, the problem is more difficult though still susceptible of a fairly satisfactory solution with relatively simple gages.

When, however, we approach the problem of taper threads, we find the situation considerably more complicated. A simple plug and ring gage must necessarily determine the simultaneous effect of variations in diameter, lead, taper, included angle of the thread, and angle of the thread axis. The step value obtained when the gage is made up on the product is the result of the mutual effect of errors in the work and in the gage which may be either cumulative or compensating. Even were perfect gages available, gross errors in lead, thread form or taper with compensating errors in diameter may exist undetected. The mating product fit may obviously be much looser, in terms of step value, than that predicted by the gage data, and the assigning of step value limits for the gaging of the product by no means insures mating product fit within these same limits.

That such a system can provide satisfactory commercial performance is demonstrated by experience with the Briggs System of pipe thread gages discussed in some detail in the Report (Revised 1928) of the National Screw Thread Commission, and in use for many years on merchant pipe.

On the other hand, the control of drill pipe and tool joint threads with such a system leaves much to be desired, due to the fact that sections are proportionately heavier and less yielding, thread engagement is longer, multiplying the effect of errors in terms of step value, and materials having higher physical properties are commonly employed.

An unquestioned improvement in the uniformity of both pipe and tool joint threads, to a degree fully justifying the establishment of this rather expensive gaging system, has resulted from the establishment of the A.P.I. system of gages for drill pipe and tool joints, with a corresponding reduction in thread troubles in the field. On the other hand, it is not generally recognized that these gages do not, in fact, constitute a limit system, and that the assigning of close step value limits in the gaging specification does not in any way guarantee a corresponding uniformity of product fit. The latter depends as well on the skill and integrity of the manufacturer and on the excellence of his equipment, both for machining and for measurement.

While there is no indication that this situation has any bearing on the subject of field failures to be discussed in a later chapter, since thread failures have practically vanished, opportunity exists for serious controversy between manufacturer and customer over the question of minor discrepancies in gaging under the misapprehension that the figures would predicate a similar error in proper mating product fit and consequent danger of failure.

Up to the present, no satisfactory solution of this situation has been suggested. Measurement of the individual thread elements requires the use of optical equipment and precision measuring machines unsuitable for use in commercial production, though applicable in some degree to the inspection of the tools with which the threads are produced. Satisfactory performance is the best evidence that the present system, desirable

for its apparent simplicity, is suitable for the purpose in spite of the technical loopholes existing.

Drill Stem Failures

Every attempt has been made in the past to design the tool joints stronger than the pipe in spite of the rather complicated loading resulting from the shouldered construction, and discussed under Section 2. It was not uncommon in the early days for the shoulder reaction to lift the pin, causing failure at the root of the pin threads and near the large end of the taper, as illustrated in Figure 1. This type of failure was practically eliminated by the introduction of heat treated alloy material with a strength so much higher than that of the body of the pipe as to overbalance the greater stress resulting from the combination of torsion, flexure and tension with the shoulder reaction, which in spite of the high thread and shoulder friction is sometimes sufficient to cause plastic flow of the metal in the shoulders.

FIGURE 1
Jumped Pin—A Rare Type of Failure Today

Split tool joint pipe ends are at times the source of considerable difficulty and can almost invariably be traced to streaks of non-metallics in the steel from which the joint is made, or from seams imperfectly chipped from the billets. These defects can usually be readily detected while the joint is being turned, and careful inspection during this process will practically eliminate the chance of joints exhibiting this weakness getting into service. There is no remedy that can be applied to save the material, as the defect is an actual discontinuity in the structure of the metal and the only safe course is to scrap all material showing evidence of this damage.

Leaks in the pipe end of tool joints are at times very troublesome, particularly since drilling practice was modified in an effort to reduce deviation of the hole from vertical. This phenomena was first discovered on a large scale in the early days of Oklahoma City where the light drilling weights employed greatly reduced the operating torque in the drill stem, and the greater depth of the wells resulted in high tension values in the string, and severe vibration. It was here demonstrated that tool joints might actually unscrew from the pipe while drilling was in progress, as discussed at some length in a paper by John Hayward several years ago. It was also demonstrated that even grossly misfitting pipe threads would plug off with mud provided relative motion was prevented, but that if the joint wabbled ever so little, mud would creep through the threads and eventually destroy them. The same remarks apply to the pin and box threads, Figures 2 and 3, illustrating an extreme case of mud cutting on a pin which has wabbled in use. The seal in the tool joint is made at the shoulder and damage to this shoulder either from abrasion or by denting is very apt to result in a washout.

At the present time wabbling of the pin and box in service, with resulting thread and shoulder wear and the concentration of loads resulting therefrom, are the principal cause of drill stem difficulties. Figures 4 and 5 illustrate typical failures of this type which invariably exhibit the following characteristics:

1. A more or less triangular section of threads is broken out near the base of the pin at two points diametrically opposite.
2. The thread form along this diameter shows relatively little loss by abrasion, as indicated in Figure 6.
3. The thread form at 90° with this diameter shows severe loss by abrasion, shown in Figure 7.
4. A small gall spot appears on the shoulder directly over the broken threads on both sides of the pin. See Figure 4.
5. A triangular section is broken out of the box shoulder at the point which mated with galled spot on the pin shoulder. See Figure 5.
6. Wear of the box threads corresponds to that of the pin threads.

This type of failure was first encountered on a large scale in 1931 in Oklahoma and results, in part, from the change in drilling practice discussed in connection with damage to pipe ends. Where high torque is applied to the drill stem in service, there is a constant tendency to make the joints up and the force is sufficient to overcome thread friction. This keeps the tool joint shoulders and the pipe ends tightly made up and prevents wabbling. If a tool joint is not tight before running in the hole it quickly makes up to a point where there is no perceptible rubbing of the threads or shoulders while drilling. On the other hand, if light drilling load is used, this torque is materially reduced, and the thread friction correspondingly increased, by the greater tension due to holding up the weight, which at the same time increases the intensity of transverse vibration and reduces the damping. As a result the level of stored energy in the stem is raised and the frequency and amplitude of stress fluctuation is increased, leading to more frequent fatigue failure.

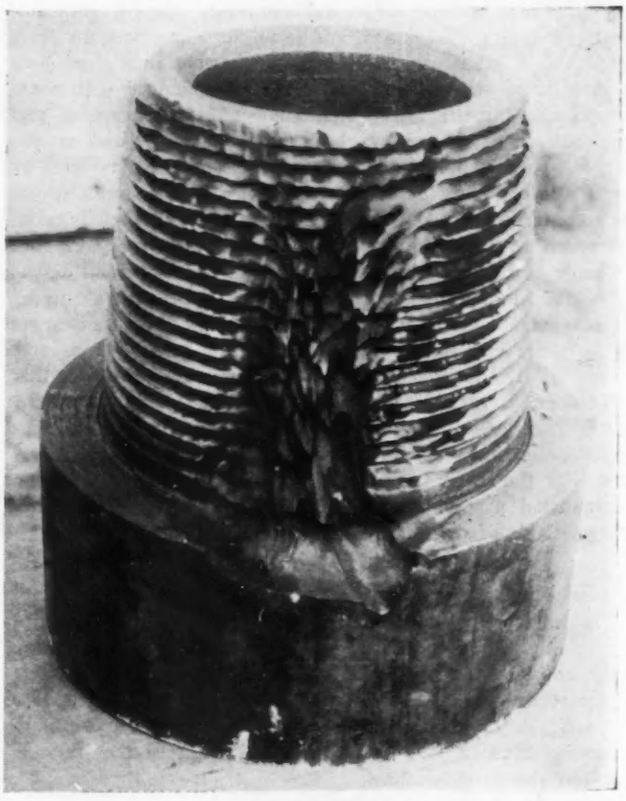

FIGURE 2
Wash-Out Due to Wabbling. (Note Shoulder Galls at 90 Degrees to Mud Cut)

To avoid wabble in service it is necessary that the tool joint be tonged up sufficiently tight so that the shoulders still remain in contact when the weight of the string is picked up and with sufficient pressure to avoid shake. This will require a very considerable tonging effort in the case of a deep well, as it is obvious that the force exerted with a tong acting on the pin threads as a jack, must set up a shoulder reaction in excess of the weight of the drill stem for the shoulders to remain tightly in contact. In other words, there is a tendency for the elasticity of the metal to permit separation of the shoulders as the pipe is picked up.

Reduced drilling weight and high rotative speeds have increased the tendency of the pipe to fail through the last engaged thread in the upset. This is invariably a typical fatigue failure, having all the appearances of a brittle fracture but with obviously ductile material on each side of the fracture. It is rather interesting to note in this connection that failures of this type were comparatively rare at a time when leaks through the pipe ends were serious, and it seems probable that the creep of the joint on and off of the pipe thread in service, distributed the fatiguing action and likewise such corrosive attack as might occur, over a considerable area, whereas when joints later were bucked up to a point where thread friction was sufficient to eliminate this creep, this damage was concentrated at one section and soon resulted in fracture. It seems unlikely that the higher stresses resulting from bucking the joints more tightly on the pipe are responsible for this type of failure in view of the fact that this practice alone has given satisfactory results in some territories, whereas in certain other districts it has been found necessary to, in addition, weld the tool joint to the pipe. This operation, of course, results in producing a ring of cast steel undoubtedly in a highly strained condition at a point in the structure where all the evidence indicates severe alternating stress. While this would not be considered good practice from a metallurgical point of view, as a matter of fact it solved the difficulty, and there is some evidence, though not in sufficient volume to permit of any generalization, that it is the water tightness of this weld rather than its added strength which is responsible for the elimination of failure of this kind.

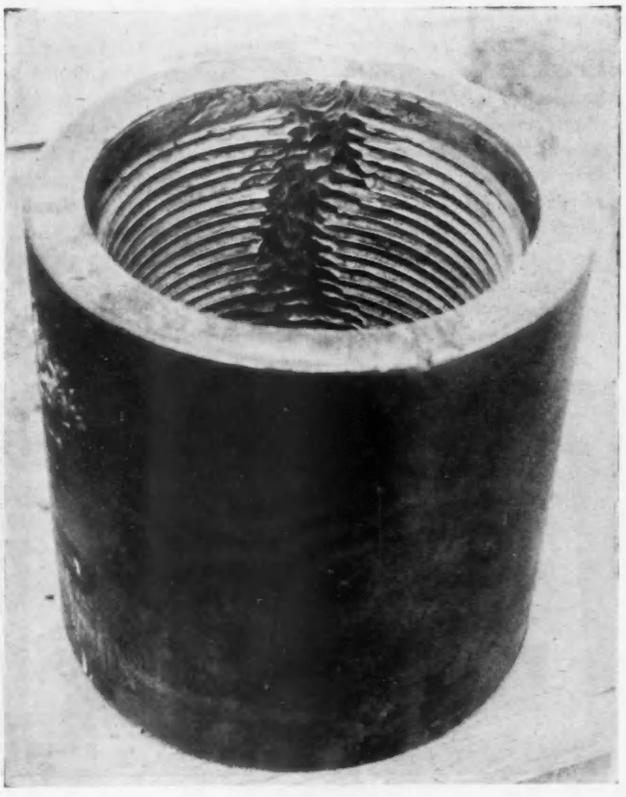

FIGURE 3
Mud-cut Box (Companion to Figure 2)

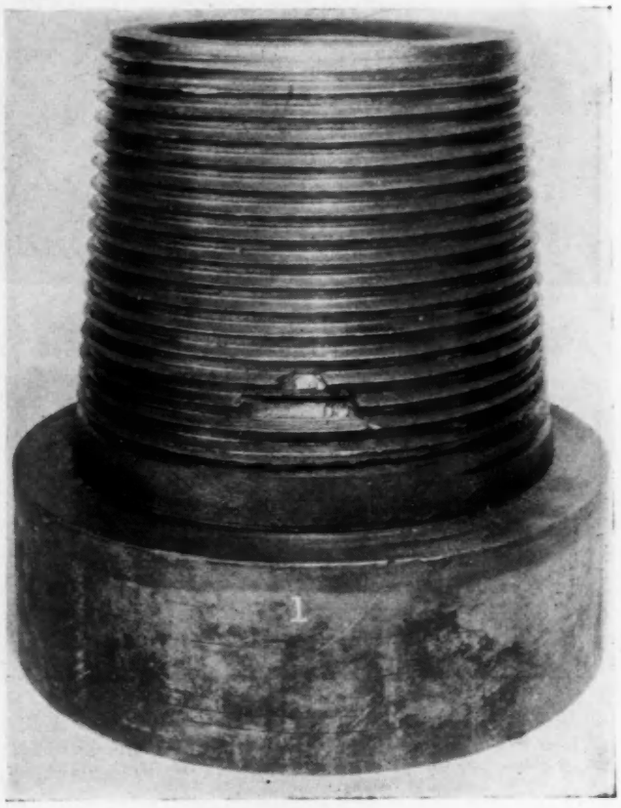

FIGURE 4
Wabbled Pin

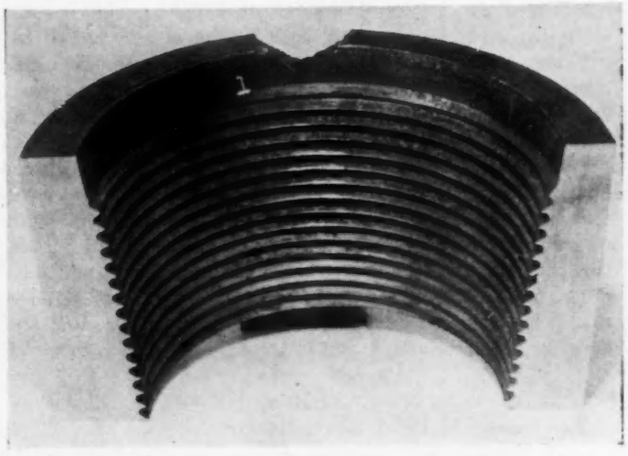

FIGURE 5
Notch Failure and Thread Cracks Just Below Mate Galled Spots on Pin Shoulders. Wabbled Box

Trouble from the galling of threads was quite common in the early days, but has been reduced to a point where it is of minor importance since the adoption of alloy steels and full heat treatment for tool joints. In addition to the physical properties of the materials, however, the character of the lubricant employed has a profound influence on failures of this type. Unfortunately, and as usual, there are in this problem two conflicting requirements. The first is that the joint be safely made up to the desired degree of tightness without

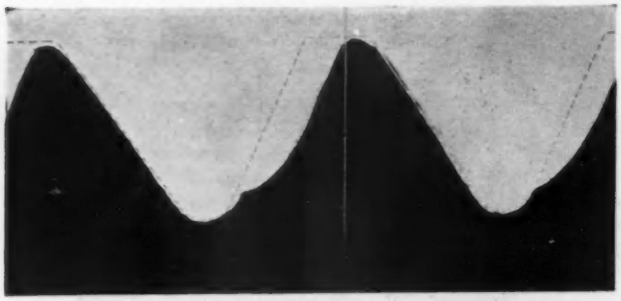

FIGURE 6
Worn Box-Thread Profile in Line with Shoulder Galls of Figure 4 (Box Shoulder to Right of Figure)

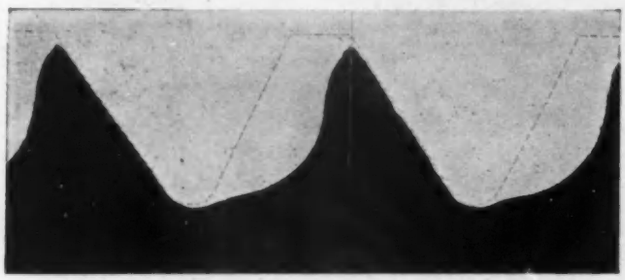

FIGURE 7
Worn Box-Thread Profile 90 Degrees from Shoulder Galls of Figure 4 (Box Shoulder to Right of Figure)

galling; and the second is that it be set up with enough friction to stay together in the hole. If a lubricant is used with sufficient body to prevent metal to metal contact under the forces exerted, it is obvious that galling can not take place, but on the other hand, such a joint is very apt to back off due to the usual low values of fluid friction. The most commonly used lubricant is red lead and cylinder oil, and a still more satisfactory material is a suspension of fine zinc dust in a medium heavy grease. The object of loading the grease with a filler is to introduce some substance, which even under the highest pressures will remain in place between the steel surfaces and prevent steel to steel contact. Temperatures of from 600 to 700°F., may be reached at the thread surfaces, particularly where the joints are made up rapidly, and oil or grease under these conditions will thin out to such a degree that it is easily squeezed out of the fit and unless some other material is left behind, a gall is almost certain to result.

Handling

The manner in which tool joints are installed on drill pipe has considerable effect on later performance of the string. Shop assembly is much to be preferred as it is difficult to keep grit out of the grease on the rig and more particularly joints must be tonged up in jerks, greatly increasing the hazard of galling partly due to the heat generated by fast rotation but more particularly from the fact that every time motion ceases there is tendency for the surfaces to seize. Where joints are made up in the shop, a low and constant speed of rotation should be employed, not over two or three turns per minute, and some type of torque indicator should be supplied so that they can be set up to uniform tightness. Care must be taken also to avoid undue variations in the consistency of the lubricant, as if it becomes too heavy joints may be overscrewed without developing the desired torque resistance.

In running pipe into the hole, every effort should be made to avoid striking the box shoulder with the end of the pin in stabbing, as this is apt to dent the surface and destroy the seal upon which the useful life of the joint depends. Even more damage is apt to result in this respect from the use of a spring hook, as the stand is apt to strike two or three heavy blows as the load bounces on the spring. As pointed out above, it is essential where drilling will be carried on with light weight that the joints be tonged up tight enough to insure that the shoulders will remain in contact even when under the tension load of the full weight of the pipe. As 6000 feet of four-inch drill pipe weighs approximately 100,000 pounds, it is evident that considerable force is required, rather more than is employed in the average case.

The practice of roping tool joints in has much to recommend it from the operator's standpoint, though it is unquestionably hard on tool joints. It should never be relied upon to set the joints up tight where light drilling weights are employed, since only those joints which happen to "hit square" at the end of the roping operation are really tight. A slight sway of the blocks will cause the joints to shoulder on one side only and while it will sound like a tight make-up, as soon as the blocks sway to center the shoulders will be loose. While the practice of tonging after roping is not so essential when reasonably heavy drilling weights are employed, and particularly with drag type bits, trouble will certainly develop if it is omitted when roller bits are run with light loads.

A number of experiments are now in progress relating to this situation, some directed to determine to what extent pin and box will unscrew during drilling, and others to the possible improvement to be effected by setting down on bottom for a short time two or three times a tower and rotating slowly with heavy torque to make the string up tight. Unfortunately the results of these tests have not been received in time to include the results in this paper.

Improvements

In the light of past experience with drill stem, it would seem that we must look to a reduction in the parasitic weight of the tool joints to reduce fatigue failures in the pipe, though it seems inevitable that this must result in some reduction in the strength of the joint itself. It is possible that in time the use of light drilling weight and high rotative speed may become so general that we can safely reduce the torque carrying ability of the joint to a sufficient degree to accomplish a noticeable reduction in weight, though there is then the hazard that when the pipe is wound up against a stuck bit serious tool joint damage may result throughout the string. See Figure 9 for an extreme case of this type of failure due to unusually low friction coefficient in the thread and shoulder, resulting in shoulder failure well below the torque capacity of the pipe section.

Some improvement can probably be secured through a change in design at the point of attachment of the tool joint to the pipe. A number of experimental strings are now under test in which the pipe thread is either eliminated or so changed in

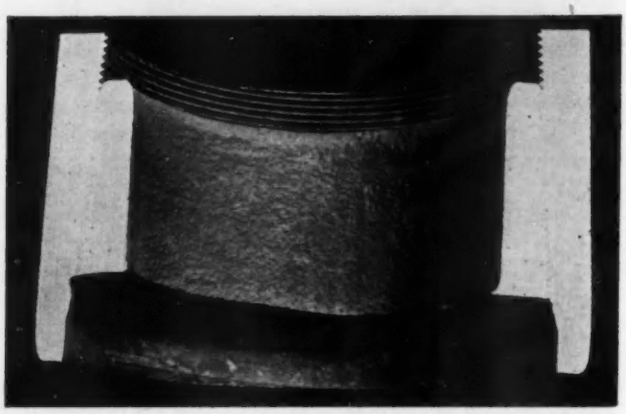

FIGURE 8
Fatigue Failure in Pipe Upset

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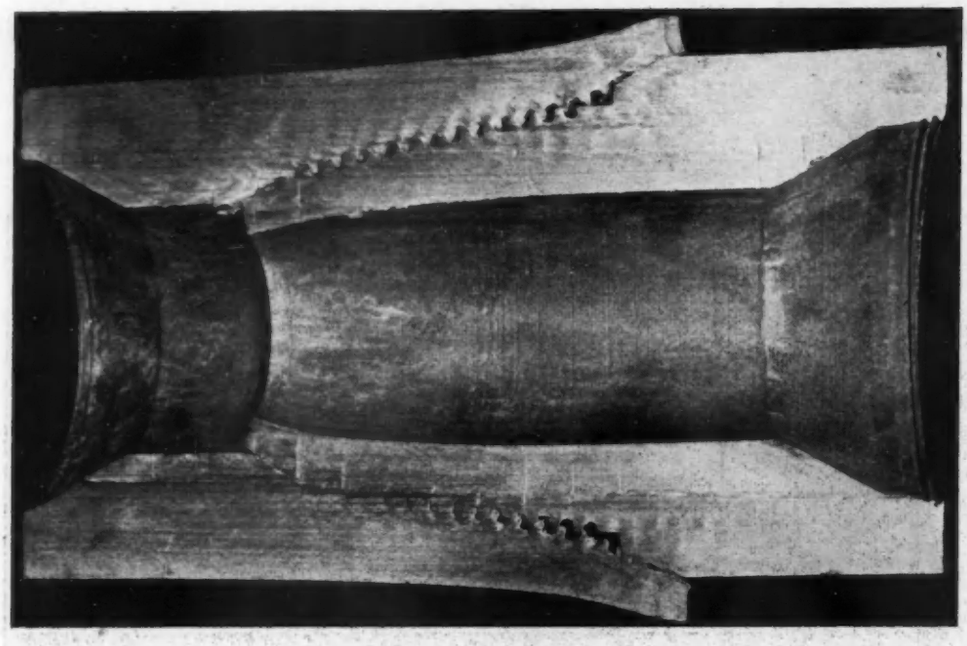

FIGURE 9

Unusual Torsional Failure Resulting from Upsetting and Shear at Shoulders.

form as to further reduce stress concentration due to the notch effect of the threads, or in which additional sealing and reinforcing means are provided to reduce stress and prevent corrosion attack at this vital point. It is still too soon to state definitely that any of these constructions will "solve the problem" though there is some indication that a degree of improvement has been accomplished.

The present high cost of fully corrosion resistant materials is the principal bar to their use to combat corrosion-fatigue failures in those districts where that type of failure is troublesome. Some improvement can be expected from the use of intermediate alloys, there being already a few strings of low chrome nickel in service. It seems likely that as price permits the metallurgical trend will be in that direction.

The ultimate development of pin and box design is difficult of prediction. In no other large scale mechanical application is a connection of this type used to transmit torsion, flexure and tension or compression. On the other hand, the requirements of simplicity, restricted dimensions, lightest possible weight, and speed and convenience of handling in make-up and break-out, rule out the use of key ways, splines, or other mechanical devices commonly employed in shafts for the transmission of power. It seems that the shouldered taper thread connection best meets all the requirements of this job, and that such improvement as is attained will result from minor refinements in thread form and to greater degree from more careful handling in service.

Discussion *by H. G. Texter*

I WILL confine myself to the pipe phase and, in general, will be merely amplifying Mr. Fletcher's conclusions. His paper covers the subject very fully and in a very interesting manner.

That a marked reduction of pipe failures through metallurgical improvement is unlikely, is a debatable question but it must be admitted that no headway is being made. Some of the most promising experiments along this line seem to be turning out very discouragingly.

Last engaged thread failures in the A. P. I. drill pipe upset are apparently very little affected by the analysis or physical properties of the steel and it is more evident every day that some radical change in the method of attaching tool joints to pipe must be developed. In fish tail drilling this type of failure is rare but in rock bit work the trouble seems to be on the increase. It is very evidently a typical fatigue failure, as pointed out by Fletcher, and is certainly caused by vibration and aggravated by the following factors:

(a) Reduced drilling weights.
(b) Higher rotative speeds.
(c) Lighter drilling muds, (sometimes clear water).
(d) Straighter holes.
(e) Mass concentration of the tool joints.
(f) Tighter initial make up of tool joints, (to prevent leakage), resulting in practically no creep and therefore no change in stress concentration point.
(g) Corrosion fatigue.

Since very little can be done by manufacturers to vary the above factors the logical step would seem to be a radical change in the method of attachment of the tool joints to the pipe to eliminate stress concentration at the root of a thread. This happens to be the line of attack receiving immediate attention and there are now being tried out shrunk connections, integral joints and new thread forms of very interesting potentialities. Reduction in parasitic mass of the tool joint is also being given much thought and in the case of one radical departure from A. P. I. tool joints, is showing some evidence of success.

With the present A. P. I. standards it seems definitely proven, for rock bit drilling, that the only safe course is to have the tool joints applied in a properly equipped shop and then welded to the pipe. This prevents both last engaged thread breaks and leakage between the tool joint and pipe. Leakage is much more often due to careless application of the joints, usually at the rig, than to error in the threads of either the tool joint or the pipe.

It should not be supposed that box-pin or tool joint drill pipe leaks and breaks are the only troubles to be overcome. Let them be even partially solved and a new mess of trouble will undoubtedly develop in the form of fatigue failures in the body of the pipe. Then the metallurgist could step in with some assurance of improving the quality of the steel and the fight for ascendency would be on again.

Discussion *by M. T. Archer*

WE know of no one more competent than Mr. Fletcher to analyze and present this subject. We hesitate to offer any comments and could, without any hesitancy, accept his statements as representing the best thoughts on the problem. Since all manufacturers are equally concerned, however, we should not pass the entire burden on to him and for this reason offer a few minor comments.

We agree that the predominant type of failure is that of fatigue, or more precisely, progressive fracture.

It is also evident that corrosive fatigue is a greater factor than has been heretofore realized. We know that the average endurance strength of steel, such as used for drill pipe, is reduced about half by corrosion. Since corrosive waters are encountered in many drilling districts this may be a major factor in drill pipe failure. We are just beginning to appreciate the importance of corrosion phenomena and it may well be that such influences are the dominant factors in the failure of many oil field materials.

Vibration, mostly transverse, is the principal mechanical destructive factor with present methods of drilling. We can hardly accept, however, that the prevailing type of pipe thread break-offs are new. Such failures have been with us, though in the past probably from drastic bending due to excessive column weight, rather than the present transverse vibrations with the lesser column weight. Caving, needless to say, is always a menace to proper drill stem performance, even with the best of drilling technique.

We agree the most promising possibility for improvements in drill pipe is through mechanical design. We do not agree, however, that metallurgical improvement is hopeless and think there will be considerable progress made in that direction. We are not sure that much lighter weight in drill strings is the entire answer. Greater flexibility through use of smaller pipe diameter, perhaps, since at least one effect here is to reduce, of necessity, the applied force.

Higher Rotary Speeds

Higher rotative speeds are apparently gaining favor. We have in mind, however, some unsatisfactory results with high speeds in California about 12 years ago but believe there is a reasonable limit in that direction.

Regarding the galling difficulties encountered with the earlier tool joints, we would remind that for some time after the adoption of the Whittier tool joint, seven threads-per-inch predominated—an inheritance from cable tool joints. Galling was frequent and probably the first real advance in tool joint manufacture was introduction of the present four-thread-per-inch standard. This, plus heat treatment, even with carbon steels, practically eliminated galling at the tool joint connection. Later heat treated alloy steels were introduced and are now used exclusively.

Regarding the relative merits of different thread forms. After careful consideration of the various thread forms, the A. P. I. adopted the present modified "V" threads. This decision, we believe, is sufficient reference on this point.

Seamless drill pipe first replaced lap weld approximately 20 years ago. The present upset proportions were not adopted until several years later. These upset proportions and the improvement in thread form appeared in about the same period.

We commend, particularly, Mr. Fletcher's very able explanation of the friction and reaction forces incorporated in the threaded connections. When one actually realizes the forces developed, we might reasonably express surprise that such joints hold up at all, rather than wonder why they fail.

We can not too highly stress the value of Mr. Fletcher's remarks regarding the proper thread lubricant. Since our present method of drilling wells does involve so many threaded connections, we can well say that the development of zinc-bearing lubricants has been one of the outstanding contributions to our industry. Such lubricants are essential even with the present quality of steel and precision manufacture. Imagine, therefore, what the problem was when only dead soft lap-weld material and low carbon seamless were used. In fact this point became so vital that it induced Mr. Speller of The National Tube Company to undertake the extensive analyses and tests which finally resulted in the development of this valuable lubricant.

It happened that the writer witnessed some of this development work and the great improvement which such lubricants permitted in the making up of threaded joints was immediately evident. Their value is so pronounced that it is now universal practice in all the pipe mills to apply metallic zinc to the coupling threads by electrolytic deposition. We are so thoroughly convinced of its merit that our company also electro-galvanizes all tool joint pipe threads and in addition advises plentiful use of the zinc-bearing lubricants when installing tool joints on drill pipe.

Mr. Fletcher has ably presented the mechanical factors involved in such tool joint thread connections and we are commenting only on the auxiliaries, such as lubricants, which will permit the proper make-up of the joints. With the aid of such lubricants, properly equipped shops can successfully make up the pipe connection between tool joints and drill pipe. We can not too strongly advocate the shop applications of such joints and are discouraged that application at the rig can be relied upon to give consistent results.

Lubrication

There is much room for improvement in the lubrication of the tool joint threads. Mr. Fletcher has commented on the usual field practice but he did not mention the lack of uniformly satisfactory lubricants for such threads. Practically every operator has his own ideas and the writer submits that we have all been negligent in not developing a lubricant more suited to this service, than is now available.

Mr. Fletcher's academic discussion of the elastic behavior of the component parts of the joint is interesting. We are glad, however, of his conclusion that the theoretical corrections mentioned are not a practical solution. Such analyses are sound theoretically and good mental gymnastics but hardly applicable in actual practice.

The dominant cause of pipe end failures is the highly concentrated stress in the thread joint which is so aggravated by bending and vibrations as to exceed the endurance strength of the steel.

Joint end thread troubles, however, are in a large measure incidental to improper handling. This coarse thread is not a water-tight thread and depends entirely on the shoulder seal to maintain a tight joint. If this shoulder is not tightly engaged at all times, the high pump pressures will cause leakage through the joint, which leakage generally results in water-cutting at the shoulders and often through the thread. Very long strings of drill pipe are now common practice and it is evident that the elastic stretch of the pin, due to this weight, tends to separate the shoulders. It is necessary that the initial tightening effort be such that the subsequent stretch, due to the weight of the string, be not sufficient to relieve all the initial stress. Unless the tonged effort is sufficient to accomplish this, washouts are almost inevitable.

Considerable attention has recently been focussed on the weight of the tool joints, with the thought that they promote an undesirable mass concentration which intensifies the stress at the thread connection. Discussion on this subject can be easily promoted. The rigid tool joints tend to develop higher stresses than the relatively flexible pipe body. On the other hand, the greater mass and different sections of these tool joints does have some dampening

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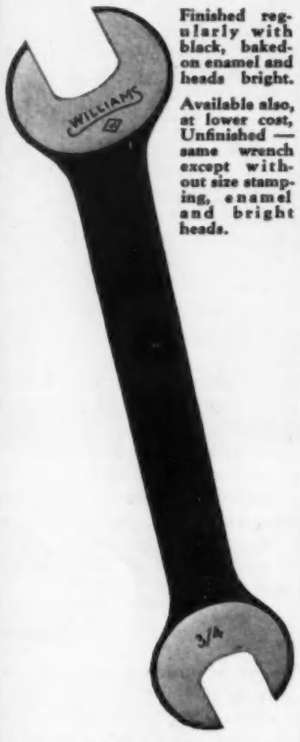

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or fly-wheel effect and smoothes out the peak vibrations which would travel freely through the drill pipe. While a lot of words have been expended on this topic we do not think that an entirely acceptable mathematical analyses has yet been presented. The full-hole tool point has received some acceptance as a correction for this mass concentration. However, their weights equal the standard A. P. I. joints and they have equal rigidity. While there is always room for improvement it is doubtful if there can be any great reduction in the present proportions of tool joints and still retain their required strength.

Mr. Fletcher very ably explains the limitations as well as the serviceability of the present A. P. I. gaging system. We agree that this system has done very well indeed and further refinement would be placing a needless burden on the manufacturer and eventually, on the industry. It is our impression that the operators have been satisfied to rely on the integrity of the manufacturers and to accept the material as presented. There have been some minor controversies between manufacturers which, unfortunately, led some users to assume that mechanically imperfect material was being offered and that this was contributing to operating difficulties. We believe this difficulty has been satisfactorily eliminated and it is a fact today that the product of reputable tool joint and pipe manufacturers conforms to A. P. I. standards. From personal contact with many competitive pipe and tool joint manufacturers we can say that no other industry offers any better example of conscientious efforts to provide both quality of material and accuracy of manufacture.

The illustrations presented by Mr. Fletcher show very well the various types of failures. His remarks amply cover the phenomena noted in connection with same. Advisability of proper shouldering has already been commented on.

Mr. Fletcher mentions several features in connection with these type failures which we believe are not sufficiently appreciated in the field. We have also noted similar failures having a high spot or gob of loaded metal on the shoulder at 90 degrees to the broken threads. Sometimes this has occurred on both sides. Also if the thread failure occurs while the joints are relatively new and little time permitted for wear the thread breakages were on one side only, but where the failure is on both sides the threads invariably show considerable wear. Such loading on the shoulders tends to prevent shoulder contact and should be removed. If the proper tonging effort were exerted, many such small spots would be compressed into the material and still permit shouldering.

Damage in Handling

We concur in the remarks regarding the handling of drill pipe while running in and out of the hole. Particularly is damage done while coming out, since it is customary to put sufficient strain on the spring hook to jerk the pin free as the last thread leaves contact. Unless the floorman can pull the pipe out of alignment before the rebound occurs, a very heavy blow will be struck on the tool joint shoulder by the point of the pin. One has only to examine most any string of drill pipe that has seen service to note this effect on the shoulders. Quite often sufficient leakage is caused thereby to cause premature failure at the shoulder.

Mr. Fletcher has so ably covered all points relating to material, manufacturing and operation and has so aptly described and illustrated the phenomena connected with various types of failures, that there is little of any consequence that can be added.

We believe that this is the first time that this subject has been so presented that the manufacturer's side will be properly understood and the operators can visualize from the illustration and description the part that actual field operation plays.

In any event, Mr. Fletcher has made a notable contribution and if we have indulged in superfluous remarks, it is only to express our general agreement with, and appreciation of his effort.

MARKETS and STATISTICS

Continued Strength Shown In Markets of the Nation

THE markets throughout the United States continued last week to exhibit strength. There were additional increases of prices for some products and some areas.

The crude oil market has become increasingly strong, and some indications point to further gains in product prices, wholesale and retail.

Curbing of illegal oil producing and refining in East Texas has become remarkably successful. The stricter control has naturally promoted further strengthening of the wholesale markets for gasoline and other refined products in the Midcontinent.

The Pacific Coast markets were placed upon a stable basis about two weeks ago, through the new marketing agreements, and are in relatively good condition.

Improved tank car prices of refined products have encouraged resumption of operations by numerous erstwhile idle refineries throughout the Mid-Continent. The greater refinery activity, in turn, has promoted strong demand for crude and more active competition among purchasers for well connections. More talk of possible crude price increases has resulted, although it is being pointed out in some quarters that product prices have merely risen to an equitable relationship with the existing crude postings.

Gasoline Market

Gasoline tank-car prices in the Mid-Continent last week were unchanged from the levels of the previous week. But kerosene prices were up one eighth-cent a gallon. The market for natural gasoline was also somewhat better.

At East Texas and North Texas refineries U. S. Motor gasoline continued to sell at the following prices: third grade, below 62 octane, material, 4½ cents a gallon; standard grade, 62-67 octane, 5 cents; and premium grade, 68-70 octane, 5¼ cent. In the Group Three (Oklahoma) area corresponding prices were one eighth-cent higher.

Kerosene was bringing 3¾ cents a galllon at East Texas refineries, 3⅞ cents in North Texas, and 4 cents in Oklahoma.

Hot oil output in East Texas has dropped off to a virtually negligible volume. Some estimates indicate around 10,000 barrels illegal oil output daily, but others show less. There are only about a dozen refineries operating in East Texas, while over 60 are idle.

With hot oil output so drastically curbed, very little contraband material is being offered even for truck traffic, which has been absorbing such products. Truck prices are consequently closely comparable with prices of products eligible for tank car movement.

More Effective Enforcement

The curbing of hot oil has resulted from unusually effective results obtained lately by state as well as federal enforcement authorities. The movement by truck, which has constituted an important leak, has apparently been appreciably curtailed by the newly effective hot oil trucking law. The law strengthens truck regulation, and prescribes confiscation of illegally produced oils detected in trucks or in storage. The Texas oil control laws have been greatly strengthened in the past months, and better results have been achieved by state enforcement authorities. They have been upheld lately in attacks made against them in the courts, and have been successful in such moves as throwing offending refiners into receivership.

East Texas Tank Car Shipments

Week Ending May 12, 1935

PRODUCTS	No Cars	Estimated Gallons
Gasoline	489	3,929,286
Fuel Oil	152	1,399,737
Casinghead Gasoline	177	1,508,848
Distillate	48	389,707
Kerosene	45	360,489
Gas Oil	25	206,518
Topped Crude	5	48,652
Residium	3	24,129
Naphtha	1	4,071
Total	945	7,871,437
Total Previous Week	942	8,029,696
Interstate	437	.....
Intrastate	266	.....
Coastwise	242	.....
Total	945	.....

West Coast Navy Bids Are Up About 7 Cents

ALTHOUGH production of crude oil in California the week ending May 11 was considerably above the official allowable, it caused no alarm, as many producers are in the habit of overproducing the first part of the month and then shut in their wells to make their allowable for the month.

There was an increase in production at Ventura Avenue, but this was brought about on account of underproduction for more than a month, due to the tanker strike and other causes. The increase at Kettleman Hills was on account of new wells and low production late last month.

But in spite of increased production of crude, there is very little hot oil and there is very little free crude on the market, much to the dismay of the few small refiners dependent on such purchases.

Natural gasoline has been a little easier, but the production in May is expected to be lower than in April, and for this reason the price for spot stuff probably will be up a fraction. Production of natural gasoline is expected to show a marked decline at Kettleman Hills this month, and the gas from the newly opened wells at Buttonwillow is dry, and will produce no natural gasoline.

The retail price situation in the San Francisco area is showing no indication of breaking and the situation in Southern California is no worse, to say the least. There is no increase in the number of cut price signs. Some gasoline is still being delivered at 11.50 to 12 cents tank wagon price, against an official tank wagon price of 13 cents for major company third grade.

There is no change in fuel oil prices, either for local delivery or for export. The bids on Navy requirements on the West Coast for fuel oil averaged about 91 cents on major company bids and smaller companies asked an average of

94 cents. These bids were close to seven cents above the previous bids several months ago, indicating a much stronger feeling on the part of the companies with stocks of any consequence.

There is no change in gasoline export prices and the large companies are showing no disposition to meet competitive prices on gasoline to East Coast, but they feel better over the indicated increase in demand in the Mid-Continent and at the Gulf.

Demand Taxes Montana Producing Capacity

THE northern Montana crude oil market picture has materially brightened within the past 10 days. Canadian refiners are again resuming operations, and indications point to a demand of around 10,000 barrels daily in northern Montana.

Within 30 days Canadian refiners will be taking around 7500 barrels daily of Montana crude and this combined with domestic demands of The Texas Company's refinery at Sunburst and Home Oil & Refining Company's plant at Great Falls is expected to raise the demand beyond the capacity of Montana's northern fields to produce.

Anticipating this strengthening of the market, the Oil Administrator boosted Montana's daily allowable from 7000 barrels in April to 11,000 barrels for May. If the market materializes, as according to present indications, a raise in price for Kevin-Sunburst, Cut Bank, and Pondera crudes may be expected. The strengthening market is also expected to increase drilling activity in these fields.

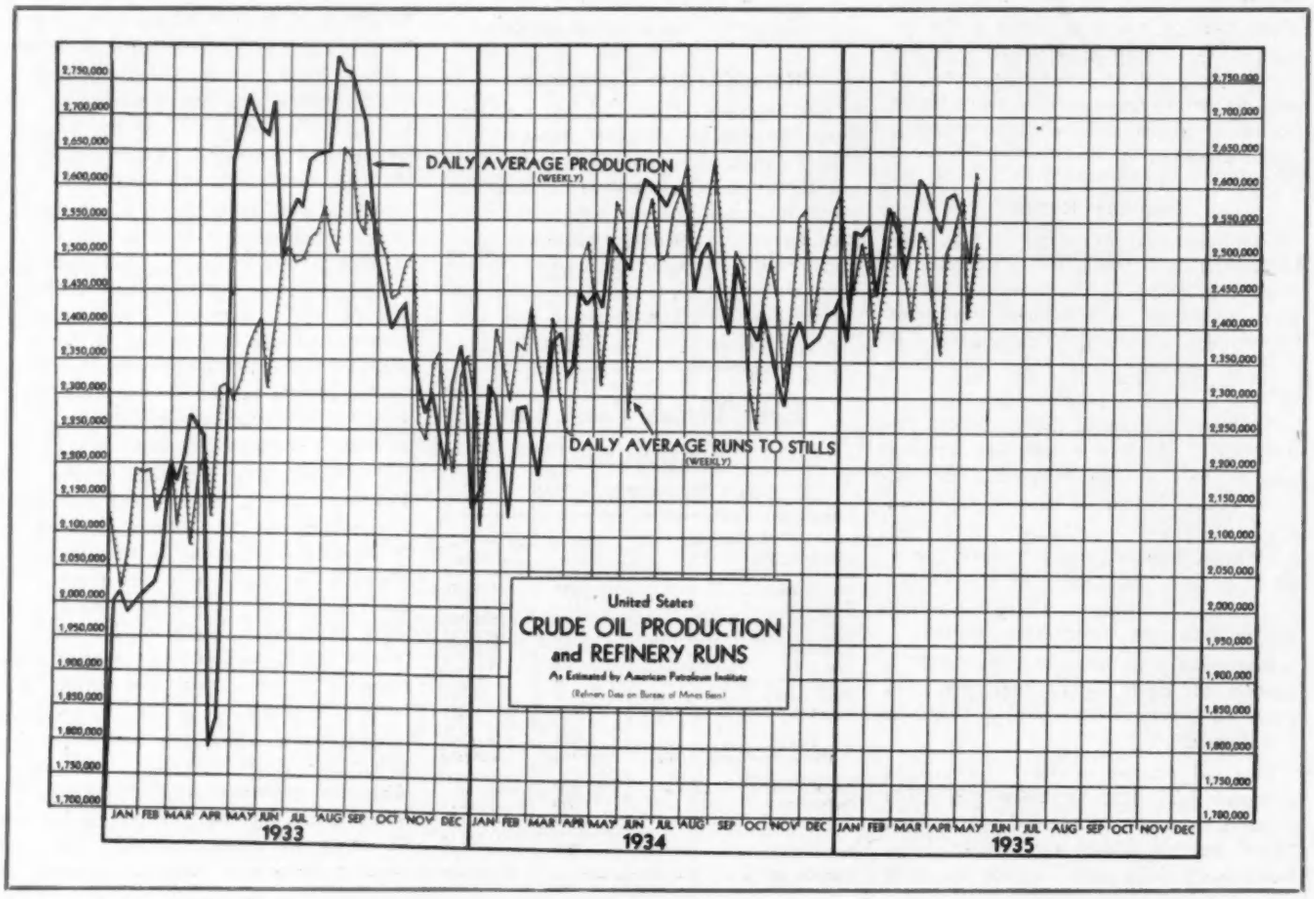
Cheyenne, Wyo.—An increased demand for Wyoming black oil is seen in the announcement of the federal highway commission here today that $10,000,000 for highway construction will be spent in Wyoming during the remainder of the year. This expenditure comes under the appropriation for highway construction in accordance with the Hayden-Cartwright Act. Other Rocky Mountain states are reported to have faired equally well under the act. The act provides a penalty to a state which diverts its gasoline tax or motor vehicle tax to other funds than those used for highway building and maintenance. Though no official announcement has been made, it is estimated that the state will spend about $4,000,000 for road oil from the $10,000,000 appropriation during 1935.

Dissolution May Follow Sale of Simms Assets

Dallas, Texas.—Dissolution of the Simms Petroleum Company and its operating subsidiary Simms Oil Company is awaiting approval of stockholders as result of directors having voted to accept an offer of approximately $8,775,000 submitted by the Tide Water Oil Company for producing and undeveloped properties held in Texas, Oklahoma, New Mexico, Louisiana and Kansas. Settled production held in Arkansas, refineries at Smackover and Dallas, besides other nominal assets are not involved in the deal and will be disposed of separately should the stockholders endorse the action taken by the board at a special meeting called for June 17.

Sale negotiations have been underway since Lehman Brothers, New York investment concern, acquired a substantial block of Simms Petroleum Company's stock late last year.

Edward T. Moore, president of the Simms Petroleum Company and its subsidiary, has notified stockholders that Tide Water Oil Company's offer involves fixed payment of $4,620,000



and the remaining $4,155,000 is contingent upon production of its properties. This large deferred payment was brought about in part due to the company's producing leases in the Yates field having recently become involved in title litigation.

Net daily average crude production maintained by Simms Oil Company during 1934 amounted to 7248 barrels from 725 oil wells and 26 gas wells, including 875 barrels daily in Arkansas to be omitted from the transaction. Principle source of production lies in the East Texas field, where net production averaged 2027 barrels daily in 1934. Yates field production averaged 1839 barrels daily and other fields in West Texas averaged 1154 barrels daily, miscellaneous field in Texas and Oklahoma averaged 1353 barrels daily.

Simms Oil Company suspended its refining and marketing operations late in 1934. and materially improved its earnings. Net income last March was 12 cents per share on capital stock. The parent organization held approximately $1,000,000 in cash when directors voted to dispose of the principal holdings, operated under the guidance of Mr. Moore and Frank R. Schneider, president and vice president. The Simms Oil Company is rated among the substantial independent units in the southwest. The present management took charge in 1920 when production was confined to the Homer field, Louisiana, amounting to about 1500 barrels daily. General offices were moved from Houston to Dallas in December.

Work Starts on Second Gas Line From Rhodessa

Shreveport, La.—Construction work was begun last week on a 12-inch welded gas line, 17 miles in length, by United Gas Public Service Company extending from the Rhodessa gas field, Caddo Parish, to its trunk line near Belcher in the same parish. The new line will provide this company with two outlets from the Rhodessa field.

This is the major project in this company's $200,000 pipe line construction program for the Shreveport division during 1935.

United Gas Public Service Company recently announced that its development program in the Shreveport division during 1935 would cost approximately $983,000, including $200,000 for pipe line projects. The sum of $258,000 was budgeted for enlarging its Rhodessa absorption plant to 90,000,000 cubic feet daily, almost double present capacity. The program also calls for nine wells in the Rhodessa field at an estimated cost each of $50,000.

June Crude Allowable Increased 89,800 Barrels

Washington, D. C.—A further increase of 89,800 barrels per day in crude oil production for June was ordered by Oil Administrator Harold L. Ickes May 16, the daily allowable for the month being set at 2,651,000 barrels against 2,561,200 barrels for May.

Gasoline output for the month was fixed at 37,490,000 barrels, an increase of 1,070,000 barrels over the May allowable, the announcement being accompanied by an order that refinery gasoline inventories should be reduced by 2,000,000 barrels during the month.

In issuing the production orders the administrator ruled that they should cease to be effective June 16 in the event that legislation extending the effective period of the industrial recovery act is not enacted.

To provide for the increased crude oil allowables, the quotas for all but two of the states were changed, Ohio and West Virginia being the exceptions with quotas of 11,300 and 11,000 barrels, respectively.

The heaviest increase was 26,400 barrels in Texas, given a June allowable of 1,059,300 barrels a day. Other increases were Arkansas, 400 barrels to 30,700; California, 18,500 barrels to 512,700; Colorado, 100 barrels to 4000; Indiana, 300 barrels to 2300; Kansas, 5900 barrels to 154,300; Kentucky, 2200 barrels to 14,700; Louisiana, 20,100 barrels to 132,300; Michigan, 2500 barrels to 36,800; Montana, 300 barrels to 11,300; New Mexico, 3500 barrels to 55,000; Oklahoma, 14,000 barrels to 514,200; and Wyoming, 600 barrels to 36,700.

The only reductions were 300 barrels in Illinois, to 10,700; 900 barrels in New York to 11,000 and 1800 barrels in Pennsylvania to 42,700.

United States Crude Oil Production Rate Higher

UNITED States crude oil production last week (ending May 18) was 28,500 barrels per day higher than in the previous week, and 91,075 barrels per day about the allowable recommended by the federal government. It averaged 2,652,275 barrels per day.

The higher production rate, as compared with the previous week, was the result of greater production in Okla-

United States Crude Oil Production

Estimates Compiled by THE OIL WEEKLY

District or State	Barrels Daily for Week Ending May 18	May 11
TEXAS—		
Texas Panhandle	65,800	55,800
North Texas	58,300	58,500
West Central Texas	25,100	23,400
West Texas	151,200	152,100
East Central Texas	48,500	49,300
*East Texas Field	447,800	449,200
South Texas	63,200	63,100
Texas Gulf Coast	178,600	179,200
*Total Texas	1,038,500	1,030,600
OKLAHOMA—		
Oklahoma City	177,750	175,150
Seminole Area	134,925	126,425
Tatums	5,100	5,100
Lucien	11,175	9,150
Fitts	16,925	10,225
Others	197,725	196,775
Total Oklahoma	543,500	522,825
KANSAS—		
Ritz-Canton	7,450	7,800
Voshell	4,575	4,650
Nikkel-Hollow	9,325	9,525
Sedgwick	10,025	9,800
Burrton-Haury	28,275	24,350
Others	92,825	89,725
Total Kansas	152,475	145,850
LOUISIANA—		
North Louisiana	23,300	23,100
Louisiana Gulf Coast	105,400	104,800
Total Louisiana	128,700	127,900
ARKANSAS	31,400	31,300
CALIFORNIA—		
Long Beach	68,000	70,500
Santa Fe Springs	37,000	38,500
Huntington Beach	41,500	42,500
Dominguez	21,500	20,500
Inglewood	11,000	11,500
Ventura Avenue	28,000	21,000
Seal Beach	8,000	8,000
Midway-Sunset	53,000	59,500
Elwood	12,000	10,000
Kettleman Hills	62,000	54,500
Mountain View	9,500	12,500
Playa del Rey	11,500	15,000
Others	147,000	149,500
Total California	510,000	513,500
MOUNTAIN STATES—		
Wyoming	34,100	34,800
Montana	10,500	10,900
Colorado	5,000	5,100
Total Rocky Mountain States	49,600	50,800
NEW MEXICO	51,100	51,100
EASTERN STATES	107,200	108,800
MICHIGAN	39,800	41,100
*Total United States	2,652,275	2,623,775
*Surreptitiously produced oil in East Texas, not included in above figures, estimated at	10,000	25,000
Grand total including surreptitious production	2,662,275	2,648,775

Crude Runs to Stills; Finished and Unfinished Gasoline; Gas and Fuel Oil Stocks; and Cracked Gasoline Production, Week Ending May 11, 1935

(Figures in thousands of barrels of 42 gallons each)

DISTRICT	Daily Refining Capacity of Plants			Crude Runs to Stills		Stocks of Finished Gasoline			(a) Stocks of Unfinished Gasoline	(b) Stocks of Other Motor Fuel	Stocks of Gas and Fuel Oil	Daily Charging Capacity of Cracking Units			Cracked Gasoline Production
	Potential Rate	Reporting		Daily Average	% Operated	At Refineries	Bulk Term., in Trans. & Pipe Lines	Total at Refys., Term., etc.				Potential Rate	Reporting		Daily Average
		Total	%										Total	%	
East Coast	612	612	100.0	428	69.9	6,081	10,356	16,437	885	245	8,838	534	469	87.8	79
Appalachian	154	146	94.8	98	67.1	1,215	886	2,101	316	130	686	79	78	98.7	23
Ind., Ill., Ky	442	424	95.9	385	90.8	6,481	2,948	9,429	809	50	4,225	349	338	96.8	111
Okla., Kans., Mo	453	384	84.8	258	67.2	3,321	2,292	5,613	720	410	4,012	256	228	89.1	63
Inland Texas	330	160	48.5	105	65.6	1,233	121	1,354	220	805	1,805	148	105	70.9	29
Texas Gulf	617	595	96.4	489	82.2	6,252	206	6,458	1,696	285	9,006	399	393	98.5	107
Louisiana Gulf	169	163	96.4	101	62.0	712	493	1,205	205	.....	3,206	77	74	96.1	16
North La.—Ark	80	72	90.0	40	55.6	159	84	243	28	200	299	46	44	95.7	6
Rocky Mountain	97	60	61.9	44	73.3	1,020	.....	1,020	101	50	791	46	39	84.8	14
California	852	789	92.6	423	53.6	8,475	1,545	10,020	990	2,855	63,558	274	274	100.0	49
TOTALS WEEK: May 11, 1935	3,806	3,405	89.5	2,371	69.6	34,949	18,931	53,880	5,970	5,030	96,426	2,208	2,042	92.5	497
May 4, 1935	3,806	3,405	89.5	2,267	66.6	34,782	18,240	53,022	5,977	4,900	96,678	2,208	2,042	92.5	477

Below are set out estimates of Crude Runs and Cracked Gasoline Production on B. of M. Basis for week ending May 11, 1935, compared with May, 1934 Bureau figures.

Estimate B. of M. Basis May 11, 1935	2,520		550
Estimate B. of M. Basis May 4, 1935	2,415		530
U. S. B. of M. May, 1934: Daily Average Crude Runs	2,460	U. S. B. of M. May, 1934: Daily Average Cracked Production	487

(a) Amount of Unfinished Gasoline contained in Naphtha Distillates.
(b) Estimated. Includes Unblended Natural Gasoline at refineries and plants; also Blended Motor Fuel at plants.

homa, Kansas, and Texas. California output was slightly lower than in the previous week.

Oklahoma's output of 543,500 barrels daily was 20,675 barrels per day higher than in the previous week, and 43,300 barrels per day more than the federal allocation. The state regularly shows production rates above the federal allocation early in each month.

California production last week averaged 510,000 barrels daily. That was 3500 barrels per day less than the previous week's average, and 15,800 barrels per day more than the federal quota.

Texas last week averaged 1,038,500 barrels daily, or about 8000 barrels a day more than in the previous week, and approximately 5600 barrels more than the federal allocation.

Kansas output averaged 152,475 barrels per day last week. It was 6625 barrels a day higher than in the previous week, and 4075 barrels above the federal allocation.

Louisiana's average daily output was 128,700 barrels daily, or about 1000 barrels a day more than in the previous week, and about 16,000 barrels daily more than the federal quota.

The above figures do not include estimates of surreptitious production. Such output, principally in East Texas, has shrunk, however, to an exceptionally low level. Last week it was indicated to have averaged about 10,000 barrels daily, compared with about 25,000 barrels daily the previous week.

Texas and Continental Spanked by Ickes

Washington, D. C.—Denial of all government patronage to The Texas Company and Continental Oil Company, because of alleged violations of Section 7(a) of the Industrial Recovery Act, is sought by Oil Administrator Harold L. Ickes.

Calling the matter to the attention of the Navy and Treasury officials, Administrator Ickes asked that the two departments refuse to entertain bids for government petroleum business from the two companies, citing as a basis for such action the executive order issued by President Roosevelt March 14, 1934, requiring the filing of a certificate of compliance on the part of all bidders for government business to the effect that they have complied with the provisions of the code to which they are subject.

The action against The Texas Company resulted from a decision of the Petroleum Labor Policy Board that it had illegally imposed a company union upon its employes at its West Tulsa refinery against the wishes of the employes, and a decision that Continental Oil Company had illegally discharged several of its employes at Hominy, Oklahoma, for union activities.

Comparison of Permits Granted for New Wells

STATE—	Week Ending May 11	Total this Mo.	Total this Year	Total this Date Last Year	1934 Year Total
Arkansas	2	4	55	15	100
California	29	46	331	190	629
Louisiana	21	43	320	296	799
Kansas	30	61	520	355	1,015
Michigan	22	40	171	173	460
Oklahoma	22	77	829	833	2,045
Texas	265	456	4,802	3,909	10,550
Total	391	727	7,028	5,791	15,598

CRUDE OIL PRICE QUOTATIONS

(Figures Represent Basic or Flat Prices—Revised to May 17, 1935)

DISTRICT	Low Grav.	Dif.	High Grav.	Date
Oklahoma-Kansas	28—$ .84	2¢	40—$1.08	9-29-33
N. and N.-C. Texas	28— .79	2¢	40— 1.03	9-29-33
Texas Panhandle				
Gray County	34— .79	2¢	40— .91	9-29-33
Carson-Hutchinson	34— .69	2¢	40— .81	9-29-33
West Texas				
Ector, Pecos, Wk'lr	*.75			9-29-33
Crane, Upton, Howard and Glasscock	*.70			9-29-33
East Texas	*1.00			9-29-33
Texas Gulf Coast				
Conroe	35— 1.09	2¢	40— 1.19	9-29-33
Tomball	*1.15			9-29-33
Cleveland	*1.00			1-11-34
†Goose Creek, Hull Liberty, Orange, Pierce Junction, Moss Bluff, Raccoon Bend, Sour Lake, Spindletop, Sugarland, West Columbia, Humble, Rabbs Ridge	Below 20— .82	2¢	34— 1.12	9-29-33
South and S.W. Texas	Below			
Refugio (Light)	20— .82	2¢	34— 1.12	9-29-33
Refugio (Heavy)	*.85			9-29-33
Saxet	*.85			9-29-33
Mirando	*.80			9-29-33
Pettus	*1.05			9-29-33
Salt Flat	*.87			9-29-33
Darst Creek	*.87			9-29-33
Arkansas				
El Dorado (Light) and Rainbow	29— .79	2¢	40— 1.03	3-17-34
El Dorado East Field and Smackover	*.70			9-29-33
North Louisiana	29— .79	2¢	40— 1.08	9-29-33
Urania	*.85-*.87			1- 1-34
South Louisiana	Below			
Lockport	20— .80	2¢	34— 1.10	9-29-33
Iowa, Cameron Mds.	Below 20— .70	2¢	34— 1.00	9-29-33
Rocky Mountain States				
Salt Creek	29— .84	2¢	40— 1.06	9-29-33
Elk Basin	*1.17			9-29-33

*All gravities—flat rate.
†Gulf Coast prices as posted by Humble Oil & Refining Company.

DISTRICT	Low Grav.	Dif.	High Grav.	Date
Grass Creek (Light)	*1.17			9-29-33
Big Muddy	*$1.01			9-29-33
Rock Creek	*1.02			9-29-33
Sunburst	*1.35			9-29-33
Lance Creek	*1.02			8-25-33
Osage	*.62			8-25-33
Cat Creek	*.45			8-25-33
Pondera	*.65			8-25-33
Hog Back, N. M.	*1.00			9- 8-33
Lea County, N. M.	*.75			9-29-33
Mid-West States				
Lima	*1.15			2- 1-35
Illinois	*1.13			1- 5-34
Princeton	*1.13			1- 5-34
Western Kentucky	*1.08			5-26-34
California				
Signal Hill	14— .65	1¢	16— .66	9- 6-33
	17— .69	2¢	22— .84	9- 6-33
	23— .88	3¢	30— 1.09	9- 6-33
Seal B., Alamitos Hts.	19— .65	3¢	20— .66	9- 6-33
	21— .72	4¢	22— .76	9- 6-33
	23— .81	4¢	26— .93	9- 6-33
	27— .96	4¢	30— 1.10	9- 6-33
Huntington Beach	14— .65	4¢	15— .69	9- 6-33
	16— .72	3¢	19— .81	9- 6-33
	20— .83	3¢	26— 1.07	9- 6-33
	29— 1.09	3¢	30— 1.12	9- 6-33
Inglewood	14— .65	4¢	16— .73	9- 6-33
	17— .76	4¢	18— .80	9- 6-33
	19— .83	4¢	20— .87	9- 6-33
	21— .90	4¢	22— .94	9- 6-33
	23— .97	4¢	24— 1.01	9- 6-33
Playa del Rey	14— .65	1¢	15— .66	9- 6-33
	16— .69	4¢	17— .73	9- 6-33
	18— .76	4¢	19— .80	9- 6-33
	20— .83	4¢	21— .87	9- 6-33
	22— .90	4¢	23— .94	9- 6-33
	24— .97	3¢	25— 1.00	9- 6-33
			26— 1.04	9- 6-33
Olinda-Brea Canyon	14— .65	4¢	16— .73	9- 6-33
	17— .76	3¢	28— 1.10	9- 6-33
Athens-Rosecrans Domingues	23— .83	3¢	24— .86	9- 6-33
	25— .90	4¢	26— .94	9- 6-33
	27— .97	3¢	29— 1.04	9- 6-33
	30— 1.08	4¢	31— 1.12	9- 6-33
			32— 1.15	9- 6-33
Elwood (fob ship)	33— 1.03	3¢	37— 1.15	9- 6-33
Torrance	14— .65	1¢	15— .66	9- 6-33
	16— .69	3¢	20— .81	9- 6-33
	21— .83	3¢	26— .96	9- 6-33

*All gravities—flat rate.

DISTRICT	Low Grav.	Dif.	High Grav.	Date
Richfield	15—$ .65	2¢	16—$ .67	9- 6-33
	17— .70	4¢	20— .82	9- 6-33
	21— .85	4¢	22— .89	9- 6-33
	23— .93	4¢	24— .97	9- 6-33
	25— 1.00	4¢	27— 1.08	9- 6-33
	28— 1.11	4¢	29— 1.15	9- 6-33
Whittier-LaHabra	15— .65	3¢	18— .74	9- 6-33
	19— .78	3¢	24— .93	9- 6-33
Montebello	19— .65	1¢	20— .66	9- 6-33
	21— .69	3¢	22— .72	9- 6-33
	23— .76	4¢	24— .80	9- 6-33
	25— .85	4¢	26— .89	9- 6-33
Coyote Hills	16— .65	3¢	19— .74	9- 6-33
	20— .78	3¢	29— 1.05	9- 6-33
	30— 1.09	3¢	34— 1.21	9- 6-33
Santa Fe Springs	21— .72	4¢	22— .76	9- 6-33
	23— .79	4¢	25— .87	9- 6-33
	26— .90	4¢	28— .98	9- 6-33
	29— 1.01	4¢	30— 1.05	9- 6-33
	31— 1.08	4¢	33— 1.16	9- 6-33
	34— 1.19	4¢	35— 1.23	9- 6-33
	36— 1.26	4¢	38— 1.34	9- 6-33
New Hall, McKittrick, Kern River	14— .57		19— .57	9- 6-33
Midway-Sunset, Elk Hills, Buena Vista Hills	17— .57	4¢	18— .61	9- 6-33
	19— .64	3¢	22— .73	9- 6-33
	23— .77	4¢	33— 1.17	9- 6-33
Lost Hills	17— .57	4¢	21— .73	9- 6-33
	22— .76	3¢	30— 1.00	9- 6-33
Coalinga	17— .57	1¢	18— .58	9- 6-33
	19— .62	3¢	21— .68	9- 6-33
	22— .72	3¢	25— .81	9- 6-33
Wheeler Ridge	17— .57	1¢	18— .58	9- 6-33
	19— .61	3¢	25— .79	9- 6-33
Kettleman Hills	33— .93	3¢	39— 1.11	9- 3-33
Pennsylvania				
Bradford	*2.20			5-16-35
Sw Pa. Pipe Line	*1.92			5-16-35
Eureka Pipe Line	*1.87			5-16-35
Buckeye Pipe Line	*1.77			5-16-35
Corning Grade	*1.32			10- 2-33
Michigan				
Central Michigan	*1.20			9-30-33
Muskegon	*.70-1.00			12-31-32
Canada				
Petrolia	*2.10			9- 9-33
Oil Springs	*2.17			9- 9-33

*All gravities—flat rate.

Summary of Wells Completed in the United States

Week Ending May 11, 1935

	Completions	Oil Wells	Gas Wells	Failures	Initial Production	Total Completions 1935	Total Completions this date 1934
Alabama	...	...	...	...	.....	3	1
Arkansas	1	1	...	...	100	67	22
California	16	10	1	5	15,675	274	117
Colorado	...	...	...	...	.....	5	6
Illinois	...	...	...	...	.....	8	3
Indiana	15	1	6	8	50	63	54
Kansas	43	27	...	16	15,145	522	288
Kentucky	10	7	2	1	510	58	30
Louisiana	9	5	2	2	2,650	265	246
Michigan	10	4	2	4	200	139	144
Mississippi	...	...	...	...	.....	7	11
Montana	2	2	...	...	240	24	36
New Mexico	3	2	...	1	13,600	99	34
New York	...	...	...	...	.....	...	3
Ohio	33	7	16	10	95	523	301
Oklahoma	54	25	2	27	32,890	837	672
Pennsylvania	...	...	...	...	.....	51	133
Texas	246	188	2	56	647,675	4,250	3,241
Utah	...	...	...	...	.....	...	3
West Virginia	...	...	...	...	.....	166	170
Wyoming	...	...	...	...	.....	16	10
Total this week	442	279	33	130	728,830	7,358	5,531
Total last week	508	333	39	136	1,005,237	....	....
Total this year	7,358	4,835	639	1,884	13,774,267	....	....

MAJOR PRICE CHANGES

	Penna. (Nat. Tr.)	Mid-Cont. (36 Gr.)	Calif. (26 Gr.)
March 5, 1933	.....	.....	Cut 24.
May 2, 1933	.....	Cut 10.	.....
May 9, 1933	Cut 20.	.....	.....
May 22, 1933	Up 10.	.....	.....
June 19, 1933	Up 10.	Up 19.	.....
June 26, 1933	Up 10.	.....	Up 9-12
July 6, 1933	Up 13.	Up 10.	.....
July 17, 1933	Up 15.	.....	.....
July 28, 1933	Up 15.	.....	.....
August 11, 1933	Up 10.	.....	.....
August 24, 1933	.....	Up 10.	.....
August 30, 1933	Up 15.	.....	.....
September 6, 1933	Up 10.	Up 10.	Up 18.
September 8, 1933	.....	Up 15.	.....
May 1, 1934	Up 10.	.....	.....
November 6, 1934	Cut 25	.....	.....
December 6, 1934	Cut 25.	.....	.....
January 4, 1935	Up 15.	.....	.....
February 4, 1935	Up 15.	.....	.....
May 16, 1935	Cut 15.	.....	.....

CRUDE PRODUCTION TAXES

Oklahoma—Five percent of gross value less royalty interest.

Texas—Two cents or 2 percent, whichever is higher.

Louisiana—From four to 11 cents a barrel, depending upon gravity.

Arkansas—2.6 percent of gross market values.

Montana—Three percent of gross value at well and ½-cent per barrel.

Wyoming and New Mexico—Production tax based upon state and county assessments.

California—.66443 mills per barrel of oil produced and 17.39 cents per acre on proved oil lands.

Initial Action at Proration Hearing for Texas Gas Control

(*Continued from page 12*)

gas well potentials and at the same time avoid the wasteful practice of flowing the wells wide open, Rowlins said. He outlined a series of tests which the Bureau had taken during the course of these experiments. A method was finally worked out whereby tests could be made through the proper use of back pressures that varied from open flow tests within a five degree limit, plus or minus. The tests extend over a period ranging from two to three hours, and the gas is flowed through an orifice meter directly into the flow line. A critical flow prover with a large number of openings is connected to the well head. Pressures also are observed during the course of this test. Rowlins explained that this was a simplified plan worked out of a series of far more complicated tests, data from which was checked against the results obtained under the plan offered.

Tests have been made by this method on wells in the Panhandle, West Texas and Southwest Texas, Rowlins said, and the results have met with the approval of operators. The system has been adopted in Michigan and may be used as an alternative in Oklahoma.

The engineer expressed the opinion that wells with rock pressures as high as 2900 pounds could be tested by this method, although the maximum pressure encountered in any well so far tested was 2000 pounds. Another important feature pointed out by Rowlins was the fact that new wells may be tested before they are put on the line, although gas produced would be wasted.

Operators showed most interest in the effect of tests on wells which contained considerable fluid in the wellbore and whether adjacent wells needed to be closed in during the tests.

Rowlins explained that tests were less satisfactory when fluid was encountered. He said that it was simpler to make the tests with adjacent wells closed in but that this would not be essential.

The engineer said that there were three important factors that should be considered when making preparations for a proration program to be applied in a gas field. The boundaries of the fields should be accurately determined and the peculiar sand conditions of each field should be studied. The most satisfactory method of taking potentials in each field should then be determined in the light of this information. Some policy should be established to provide a proper allocation for acreage.

Rowlins recommended that commission engineers be left free to determine the proper method of taking potentials in each field, rather than having some set plan instituted for all.

His instructions before coming to Texas prevented Rowlins from making any suggestions concerning the numerous controversial issues which have arisen as a result of the gas problems in the state. He confined himself to answering questions concerning the tests made by the Bureau of Mines and his conclusions concerning those tests.

He declined to make any suggestion as to the amount of acreage that should be allocated to a well, or to attempt to define the probable drainage area of the individual well. Neither would he attempt to define the distinction between a gas well and an oil well. He stated, however, that some experiments had been made to determine the drainage area of gas wells, but that the data was incomplete and the Bureau of Mines had reached no conclusion on this question.

Rowlins volunteered the services of his staff and himself to assist the commission in taking potentials. He offered this work in conjunction with the tests which the commission plans.

The commission finally recessed the hearing until June 14 at Amarillo. Chairman Thompson stated that potential tests will be taken in the Panhandle during the interim. The results of these tests will be observed before the commission proceeds further with the question.

Agua Dulce

Maston Nixon, receiver for the Clymore stripping plant in the Agua Dulce field, raised the question of a permit to allow operation of that plant until August 1, 1935, when the general gas proration program is expected to become effective.

He declared that this field was as much without a market as the Pledger Plant in Brazoria County, to which the commission has recently granted a permit to run for that length of time. Nixon pointed out that the Clymore plant was the only one shut down in the state, and that the commission was discriminating unless it was permitted to operate on the same basis as the others.

He stated that there was no market for the gas as fuel.

The commission declined to act on the case at once, stating that a decision would be rendered later.

Chairman E. O. Thompson of the commission said that the Bureau of Mines had reported a finding that the consumer demand for Texas crude during June would be 1,059,300 barrels per day, an increase of 26,400 barrels over May.

The commissioner said that he and Commissioner Terrell had discussed with E. B. Swanson, director of the Bureau's statistical division, the problem of supplying oil to refineries in Texas which were shut down for want of sufficient crude. Thompson said that the increase recommended to the commission coincided closely with that which he and Terrell had suggested.

Thompson also outlined plans for making key-well potential tests in the Panhandle area to effect an adjustment of potential allowances there. Fifteen wells in the dolomite and 15 producing from the granite wash formation will be used as a basis for making allocations.

The Texas Company representatives sought a revision of the five-day potential tests for new wells completed in the Panhandle. It was contended that the time of the test should be limited to three days in order to reduce the total production from these wells.

Most operators appeared to agree that a three-day test would be sufficient, and that an average for the period would be the most successful means of determining the proper potential of the well. The Texas Company and Humble Oil & Refining Company asked that they be relieved of some of their connections in the area, as they were now accepting 5000 barrels per day more than they had nominated to purchase.

An increase in the allowables for the Sayre and McCamey fields was requested by the Texas Pacific Coal and Oil Company, although no specific figure was named.

The Cosden Company asked that the Howard-Glasscock allowable be raised 3000 barrels per day, in order that it might obtain a total of 8000 barrels daily for the two refineries deriving their supply from this field.

Higher allowables for North Cowden and the Penn pool were requested by E. A. Landreth. He presented figures to show that the 12.5 percent potential allowance for North Cowden was the lowest for any of 17 fields located in the area, and that the average potential allowance for these fields was 21 percent. He asked a 2000-barrel increase.

Landreth said that wells in the Penn pool produced inefficiently when cut below 65 barrels per day, and asked that this field be raised 1000 barrels. He pointed out that the field had been

developed conservatively and now has one well to 38 acres.

An additional 500 barrels for the Louise field was requested by Pure Oil Company. The commission was told that most of the current allowance of 845 barrels was distributed among water wells in the field to prevent them from being injured when shut in too far. He pointed out that this resulted in a small allowance for the wells producing pipe line oil, and that land and royalty owners on the better properties fared worse under the present system than did those with poorer properties.

The Texas Company asked that the Manvel allowable against be increased, the additional oil to be run to the company's refinery at Port Arthur. Oil from this field is in demand as a source of lubricants, the commission was told.

Operators from southwest Texas protested that the high allowable for the Samfordyce field, Hidalgo County, is ruining the price for Mirando crude throughout the section. It was stated at the hearing that the production was being sold below the market price.

John Boyle, representing operators in the Greta and Government Wells fields, asked that the allowables be readjusted between fields in this district. A request from Humble Oil & Refining Company that it be relieved from connections producing 3000 barrels per day resulted directly from the situation in Samfordyce, Boyle contended.

There has been no material change in the physical conditions in East Texas during the past month, according to Gordon Griffin, chief petroleum engineer for the commission. He recommended that the allowable of 3.4 percent of the hourly potential remain unchanged.

C. P. McGaha of Wichita Falls, again requested that the commission grant an increase of 1500 barrels daily to the district. A similar request was made at the last hearing.

A new order fixing allowables for all fields is anticipated about May 23, in order to give the commission sufficient time to prepare schedules for all the fields.

New Mexico Pipe Lines Move 1,564,374 Barrels

Hobbs, New Mexico.—Pipe lines serving the ten separate oil producing areas in New Mexico transported during April a total of 1,564,374 barrels, or a daily average of 52,146 barrels, according to compilation made by C. G. Staley, proration umpire. Fields outside of Lea County, the principal oil center, produced 84,360 barrels, or a daily average of 2812 barrels during April.

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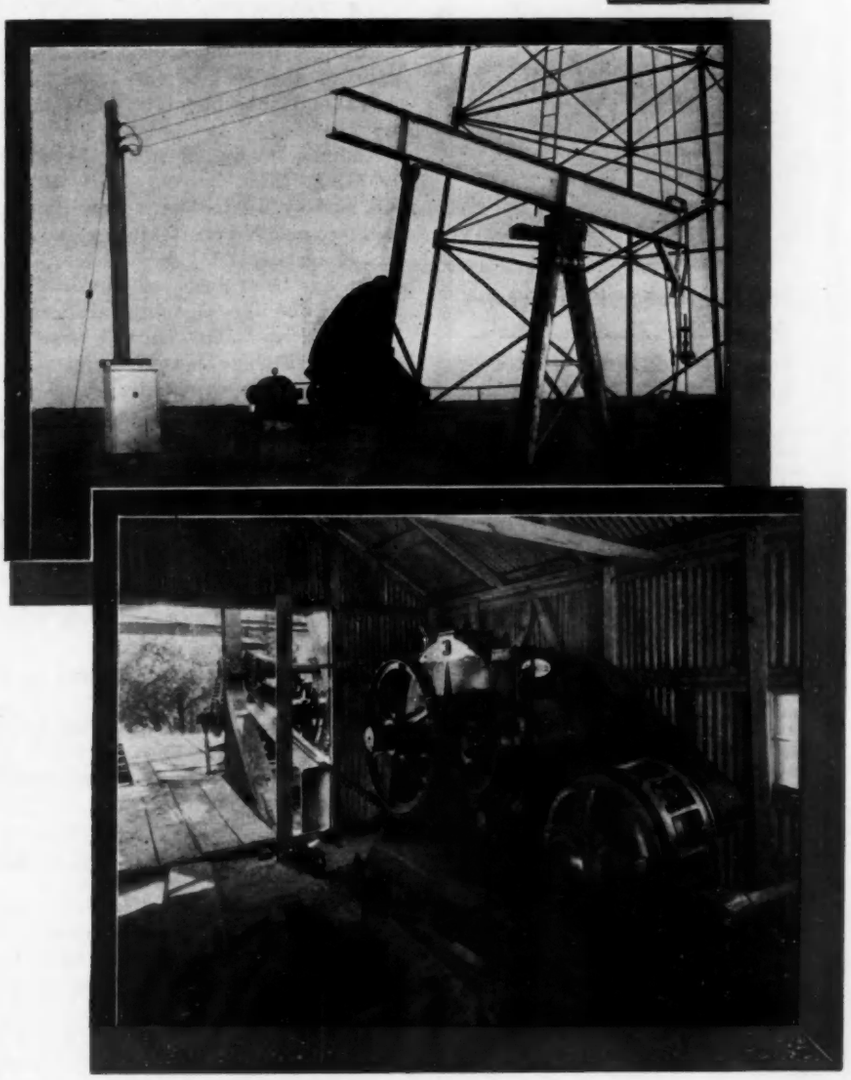

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Pipe Line Connection for Samfordyce Contemplated

San Antonio, Texas.—Direct pipe line connection for the Samfordyce field, Hidalgo County, with tanker loading facilities at Port Isabel, will be constructed immediately by Cortez Oil Company and associates, according to Bert F. Weekley, Fort Worth, president. Announcement was published last week that such a line was contemplated. It will involve the building of about 83 miles of six-inch pipe, exclusive of gathering system. O. R. Seagraves, Houston, and Edgar H. Stapper & Company, New York bond concern, are to be associated with the project.

Oil Scouts Association Convenes in Corpus Christi

Corpus Christi, Texas.—National Oil Scouts Association of America, Incorporated, will open its annual meeting here May 20 to continue through May 21. Registrations began the afternoon of May 19.

Business meeting will open at 9:30 a. m. on the deck of the Plaza hotel, as will all subsequent business meetings.

Address of welcome will be made by M. P. Giles, mayor. This will be followed by a paper on a new type of drilling equipment, featuring an attached electrical logging device. The paper has been prepared by Dr. J. C. Karcher, of the Geophysical Service, Incorporated, Dallas. He will be assisted by J. Elmer Thomas, independent operator of San Antonio.

New Development in South Texas territory will be discussed by W. F. Knode, Southern Minerals Corporation, Corpus Christi. Following that Fred B. Shayes, of the United Production Corporation, Beeville, will talk on the use of electrical formation testing equipment. E. R. Smith, or another representative of The Lane-Wells Company, Houston, will discuss the use of gun perforating in drilling and completing wells.

At 2:00 p. m., there will be an entertainment for ladies and gentlemen at La Quinta Club, including golf, tennis, swimming and bridge.

Barbecue will be served at 5:00 p. m., followed by a boat ride on Corpus Christi Bay starting at 8:45 p. m.

May 21 morning session will commence at 9:30 a. m. The majority of the morning will be taken up with the election of officers, announcements and general discussion.

At 1:00 p. m., there will be a handicap golf tournament, in which a number of prizes will be given. The ladies will attend a coffee and entertainment at the Corpus Christi Country Club in the afternoon.

At 8:30 p. m., the convention will be brought to a close with an informal dance at the Plaza hotel deck. Winners of the golf tournament will be awarded their trophies there.

Series of Safety Sessions In Mid-Continent

Tulsa.—For the furtherence of interest in safety activities among Oklahoma industries, the Mid-Continent Petroleum Safety Council and several chapters of the American Petroleum Institute are holding three supervisors safety meetings beginning Friday evening, May 17, at Ponca City. On Monday night, May 20, the meeting will be held at Wichita, Kansas, and Tuesday night at Shawnee.

Added features to the meetings this year are the appearance of Charles B. Scott of Chicago, president of the Bureau of Safety, and past president of the National Safety Council. Scott will address the gatherings on "Social and Industrial Values of Accident Prevention." H. W. Blakeslee, secretary of the Accident Prevention Department, American Petroleum Institute, Dallas, will be present and speak at all meetings.

Advanced reservations for the meetings are as follows: Ponca City, 160; Wichita, 150; Shawnee, 275.

Lew Roberts, Empire Oil & Refining Company, of Ponca City, is in charge of arrangements at that point. A. S. Ritchie, Derby Oil Company, is in charge at Wichita, and D. M. Engle, Sinclair Prairie Oil Company, Seminole, is in charge of the Shawnee meeting.

The general program for the three meetings is as follows:

Invocation, local minister; Dinner, music and entertainment.

"Where Do We Go From Here?" J. H. Savage, president Mid-Continent Petroleum Safety Council.

"Benefits and Hazards Affecting the Oil Worker," H. W. Blakeslee.

"Social and Industrial Values of Accident Prevention," Charles B. Scott.

Toastmasters for the Ponca City and Wichita meetings have not been announced. Toastmaster for the Shawnee meeting will be R. W. Hendee, president of Oklahoma Natural Gas Company, Tulsa.

Officers of the Mid-Continent Petroleum Safety Council are J. H. Savage, Mid-Continent Petroleum Corporation, Tulsa, president; R. S. Huffman, Oklahoma Natural Gas Company, Tulsa, vice president; D. M. King, Phillips Petroleum Company, Okmulgee, secretary and treasurer.

Bright Picture in Oil

(*Continued from page 10*)

LEGISLATION

Federal Proposals Hitting Snags

THE petroleum industry has been generally disturbed by two important federal bills proposing stricter regulation of the industry: the proposed new N.R.A. bill, and the Thomas bill. Both measures are widely opposed in the industry, on the grounds they would unduly hamper the business. Both are, however, finding hard sledding in Congress.

Controversy Over N.R.A. Bill

THE bill to extend the recovery act beyond its mid-June expiration date is a long way from enactment. The President and the House want it adopted largely as written, two years of life being provided. But the Senate last week asserted it would not go further, after passing a resolution extending the N.R.A. in a much contracted form only until April 1, 1936. The amendments exempt intra-state business, and eliminate price fixing except in natural resource industries.

The N.R.A. bill is opposed by many within the oil industry because it would permit the industry to be declared a public utility. It is also opposed because of a yearning to be free of inhibitions and annoyances that have been suffered under the oil code, as set up under the recovery act.

No Action on Thomas Bill

THE Thomas bill is meeting strong opposition, similarly, because of unwillingness to accept government domination and restrictions. The bill has been reported favorably by the mines committee of the Senate. But Senators of Texas and other states are fighting the measure, and it has not come to a vote in the upper house. In the House the measure is still in committee. That the bill will become law thus appears highly doubtful, especially in view of the congestion of unpassed important legislation in Congress in this closing portion of the session.

Interstate Compact Approval Desired

WHILE there is much objection to the N.R.A. and Thomas bills, the industry is generally desirous of action by Congress approving the interstate oil control compact proposal. Such a compact has been ratified by the legislatures of five important oil producing states. It would afford means for keeping production balanced with demand, independently of such measures as the recovery act, the oil code, or a Thomas-type law. For guidance of the states in determining allowables under the compact, it is contemplated they would have the cooperation and advice of the United States Bureau of Mines. Even if the compact is not approved by Congress and adopted, of course, the individual states could obtain the advice of the Bureau of Mines in fixing allowables.

Other Federal Control Ideas Sanctioned

THERE is also general recognition that a well rounded out program of oil supply and demand balancing should make provision for restriction of imports from foreign fields. Consequently, there would be much approval and little opposition if Congress would incorporate control of imports in legislation this session. At present imports are controlled under the code.

It has also been recommended—and there would apparently be little opposition—that Congress make permanent the Connally Act. That law bans from interstate commerce oil produced in violation of state laws.

Texas Oil Laws Strengthened

TEXAS, the leading oil producing state, has been the seat of much of the oil control difficulty of the past several years. It is nationally significant, therefore, that the state has considerably stronger oil control laws in consequence of measures adopted this year by its legislature, which has just adjourned. The legislature extended for two years longer the authority of the railroad commission to consider market demand in fixing oil production allowables. It plugged up various leaks in the state's oil conservation law. It created special courts in East Texas for handling violations of the oil laws. It passed a law to eliminate the notorious waste of gas in the Panhandle. It ratified the interstate compact. Near the end of the session it enacted a law providing for state confiscation of illegally produced oil in storage or in transportation.

The latter measure was aimed particularly at illegal trucking of gasoline or other oils. It is intended to strengthen the already relatively effective control of shipping that prevails under the federal and state tender boards.

Legislation in Other States

LEGISLATURES of some other important oil producing states also have strengthened oil control laws. For instance, the 1935 legislatures of Oklahoma, Kansas, Arkansas, and New Mexico, as well as of Texas, approved the interstate oil control compact.

There was also, of course, some legislation in various states adverse to the oil industry, particularly in the form of tax increases. Oklahoma, for example, raised its gross production tax from three to five percent.

Polo Extension Test Responds to Acid

Perry, Okla.—Atlantic Oil Producing Company's Porter 1, SE NW SW 22-22n-2w, half-mile extension of the Polo pool of western Noble County, gave a surprising performance late in the week after being treated with 1500 gallons of acid in Simpson Dolomite from 4927 to 4935 feet. Production the first hour through casing was 135 barrels, the next 30 minutes 60 barrels through tubing and the next 25 minutes 45 barrels through tubing with 100 pounds pressure on the flow string and 25 pounds on the trap.

This test was running low on upper formations and operators for this reason decided to test the dolomite with acid.

Oklahoma City Wilcox Wells Continue Decline

Oklahoma City.—Potential tests on 477 wells in the Wilcox sand zone of the Oklahoma City pool show a combined rating to 603,737 barrels per day compared to 859,009 barrels per day in November, 1934. This is a decline of 29.7 percent on the basis of the new ratings. However, November potentials were arrived at by multiplying the four-hour gauge by four and the new potentials are determined by multiplying the four-hour gauge by six. Using the method of last November the present potential on the 477 wells would be 391,758 barrels daily, a decline of 54.4 percent.

Carter Oil Takes Beckham County Block

Sayre, Okla.—Carter Oil Company has placed on record a block of approximately 5600 acres in Sections 1, 2, 3, 5, 6, 10, 11 and 12-7n-25w; Sections 31, 34, 35 and 36-8n-25w; and Sections 24 and 25-8n-27w, in the southwestern portion of Beckham County adjacent to the Oklahoma-Texas boundary. This is near a block which was recently taken by Humble Oil & Refining Company, principally in Childress County, Texas, but extending over into Oklahoma approximately one mile.

Edmond Extension Try Reported Flowing

Edmond, Okla.—Gulf Production Company of Oklahoma's Lindsay 1, NE SW NW 6-13n-3w, three quarters of a mile southwest of production in the Edmond pool of northwestern Oklahoma County, was reported early in the week to have made a five-minute flow over the derrick and to have built up 700 pounds pressure on the casing head shut in over night. This test is truly a mystery well since operators have divulged practically no information concerning it and that which has been made available has been questioned. The test was shut down at 6700 feet late in January of this year and supposed not to have reached Wilcox sand at that depth. The report now is being made that lower Wilcox sand actually was topped at 6620 feet. On this basis datum would be minus 5466 feet which would make it structurally higher than the discovery well and several of the wells which have made large producers in the northern portion of the pool.

Ardmore, Oklahoma. — Carter Oil Company's Humble-Williams 1, SW NE SW 27-2s-3w, in the heart of the old Fox field of northwestern Carter County, was drilling below 5806 feet in limestone which apparently is Viola. This test will be carried to 10,000 feet if necessary to fully test the Simpson formation.

Oklahoma County

Edmond, Oklahoma.—Gypsy Oil Company's Shock (Mitchell) 1, NW SW SW 2-14n-3w, wildcat test five miles north of here in northwestern Oklahoma County, topped Viola lime at 6205 feet, and cored from 6283 to 6302 feet, recovering 4½ feet of Dolomite and limestone showing a small amount of oil. It is 107 feet lower on Viola lime than Sinclair Prairie Oil Company's Koatsch 1, SW SW SW 23-15n-3w, wildcat discovery well three miles to the north in southwestern Logan County.

J. C. Shaffer et al's Hammond 1, SE SE SW 10-15n-4w, in the same portion of Logan County, had Second Wilcox sand at 7137 feet and was drilling ahead below 7170 feet with nothing showing.

Oklahoma Completions

Company, Well and Location	Init Prod. Bbls.	Depth
BECKHAM COUNTY—		
Fred Coogan et al, Shelton 1, sw sw sw 33-10n-25w	*	3745
COMANCHE COUNTY—		
Westheimer & Daube, Watson 5, ne ne ne 24-2n-10w	22	1842
CREEK COUNTY—		
Anderson & Kerr, Harjo 1, ne nw nw 25-14n-10e	*	3395
W. C. McBride, Inc., Starr 32, sw ne se 8-18n-7e	80	2543
Sinclair Prairie, Long 1, nw nw nw sw 9-18n-7e (otd 2585)	25	2633
GREER COUNTY—		
Lloyd Cole et al, Murrell 1, se sw se 17-3n-21w	*	898
JACKSON COUNTY—		
Buell & Margay, Cole 2, sw sw sw nw 3-1n-20w	*	1767
OKFUSKEE COUNTY—		
Durkee et al, Martin 1-A, ne sw ne 2-10n-11e	25	1720
Stekoll & Moffett, Pharoah 2, ne ne se nw 26-11n-11e	25	1695
OKLAHOMA COUNTY—		
Harrell-Davis, Little 1, ne sw sw 22-11n-3w	*	5866
Marydon Oil Co., Stamper 2, ne sw ne se 22-11n-3w	150	6520
W. H. Atkinson et al, Reed 1, ne ne ne 4-12n-3w	*	6954
OKMULGEE COUNTY—		
Crews & Armstrong, Beams 3, ne ne se 4-15n-14e	*	945
C. Peterson, Ware 15, sw sw nw sw 9-15n-14e	*	2765
Norbla Oil Co., 2, nw nw sw sw 27-20n-10e	*	2521
Barnsdall, 27, ne sw sw ne 30-21n-9e	45	366
Johnson O&R Co., 13, ne nw ne se 30-21n-9e	20	1076
W. C. Norris, 3, nw se sw ne 29-21n-11e	30	2009
Bay Oil Co. & Norbla Oil Co., 1, se se se 24-22n-7e (pb 3012)	*	3018
Phillips, 1, sw sw sw sw 19-22n-8e	lcn.	abd.
Peters Pet. Co., 12, cel w½ e½ nw 26-25n-9e	*	2777
Empire & Sinclair Prairie 1-B, se se se 34-26n-3e	*	2597
Texas, Revard 5, ne nw ne sw 17-21n-10e	4½	2534
Bennett 2, se se nw 12-23n-7e (pb 2912)	50	2914
PONTOTOC COUNTY—		
Sunray Oil Co., Curtis 1, sw se nw 13-1n-7e	*	4471
Delaney Oil Co., Hardin 5, sw nw nw 30-2n-7e	14,160	4380
Moore et al, Mitchell 1, nw sw nw 31-2n-7e	3714	4464
Smith 2, ne nw nw 31-2n-7e	1564	4210
Smith 3, nw ne nw 31-2n-7e	3712	4239
Smith 4, ne ne nw 31-2n-7e	8508	4115
Boetcher, Starrett 2-A, nw ne se 23-4n-7e	75	1711
Radial Oil Co., Simpson 1, ne nw ne 20-4n-8e (pb 1527)	225	1528
Mayfield, Smith 1, sw sw sw 19-5n-5e (otd 2569)	35	2660
Mason, Layne 1, sw nw nw 30-5n-5e (otd 2553)	50	2690
Norris & Wilson, Call 1, nw se sw nw 22-5n-8e	12	915
POTTAWATOMIE COUNTY—		
Hunton Oil Co., Garrison 1, ne sw se 12-7n-3e	*	4327
Peru O&G Co., Vinson 1, nw se ne 13-7n-4e	60	4053
Texas, Colvin 4, ne nw se 7-8n-5e	*	4340
SEMINOLE COUNTY—		
Arrow Drilling Co. et al, School Land 1, se se se se 11-6n-5e	*	3891
Magnolia, Reed 7, se sw se 30-7n-8e (pb 3158)	*	4134
Empire, Meyers 6, nw ne ne 31-7n-8e (pb 4260)	50	4287
Murphy, Butler 1, ne nw nw 14-9n-6e	226	3913
Turman Oil Co., Jones 3, nw se ne 34-9n-6e (otd 4215)	24	4292
STEPHENS COUNTY—		
Lewis Sykes, Furst 6, se se nw 16-1s-8w	*	2145
Furst 7, nw se se nw 16-1s-8w	*	2116
Bridwell Oil Co., Montgomery 1, nw sw nw se 11-2s-8w	¶15	2027
California Prod. & Operating Co., Florence 1, sw se sw 12-3s-6w (pb 842)	*	1807
Sitton 1, ne se sw 12-3s-6w	*	668
Silton 2, sw ne se sw 12-3s-6w	*	456
Heiden & Culberson, Woods 1, nw ne sw 12-3s-6w	*	365
A. A. Peard et al, Impson Smith 1, nw nw se 12-3s-6w	lcn.	abd.
Sitton 2, nw nw sw se 12-3s-6w	*	753
TULSA COUNTY—		
Mechling, McIntosh 6, cnl sw nw 13-17n-14e	*	1882
North et al, Lacy 1, sw sw ne 4-18n-14e	¶1	1401

*Failures; †Junked; ¶Million cu. ft. gas.

Large Gorham Area Wells Attract Attention

Russell, Kansas.—Recent completion of several unusually large wells in the old Gorham area has intensified interest there with the result that wildcat or semi-wildcat operations are being started in several directions from production. Bridgeport Machine Company was digging cellar for Nelson 1, NW NW SE 8-14s-15w, one half mile south of production. This company recently completed the largest well in the pool when Witt 1, NW NW SW 3-14s-15w, yielded 1336 barrels on a potential test.

O. J. Connell et al had material on the ground for F. Krug 1, NW NE NW 26-14s-14w, three quarters of a mile from production in the Gurney pool. Gypsy Oil Company also entered this area during the week when it started laying material on the ground for Gurney 1, NW NW SE 23-14s-14w, southeast diagonal offset to the discovery well.

Great Bend, Kansas.—Carter Oil Company has staked location for Wissman 1, NW NW NW 31-18s-15w, a wildcat test approximately 14 miles northwest of here in the western portion of Barton County. It is seven miles northeast of Treleaven and Brim's discovery well near the town of Albert and to the southeast of the Otis field of Rush County. Rush County was included in the list of new wildcat operations with the staking of location for Lario Oil & Gas Company's Gilling 1, NE SE NW 24-17s-17w, five miles northeast of Bison in the east central portion.

Special Hearing on Van Scheduled June 10

Austin, Texas.—A special hearing on the Van field has been scheduled tentatively by the railroad commission for June 10 at Austin.

This hearing was requested by Pure Oil Company, principal operator in the field, to consider the results of potential and bottom hole pressure tests now being conducted in the field.

The commission and Pure Oil Company have made tests, independently, and a revision of the method of allocation probably will be made when the results are finally available.

Cayuga Trinity Sand Test at Critical Depth

Palestine, Texas.—Importance of the Trinity sand section underlying the Cayuga field, Northwestern Anderson County, as a probable source of production is nearing a decision in the deep test of Tide Water Oil Company and Texas Seaboard Oil Company near the center of their discovery leasehold. Previous depth records for East Texas have been shattered by their N. N. Willis 21-A in progressing to the 8010-foot level, which is believed to be near the lower section of the Trinity series. Identity of the formations and depths encountered are being withheld, although it is known that the upper section of the Trinity has proved barren of oil or gas production.

Top of the Georgetown lime, or Lower Cretaceous series, was logged near the 4650-foot level, with an elevation of 308 feet. Approximately 3360 feet of the Lower Cretaceous has been penetrated. Pure Oil Company's V. T. Davis 1, a deep failure on the northwest flank of the Van field uplift, penetrated 3748 feet of the Lower Cretaceous in testing the Travis Peak, or lower section of the Trinity sand series, at 7501 feet.

An irregular bottom hole water table for the Woodbine zone in the Cayuga field was again brought to light the past week when Clark & Cowden Drilling Corporation's J. W. Barton 1, near center of 9.86-acre lease, Thomas Bristow Survey, situated on a northeast outpost location, registered above the average initial flow at 4115 feet, or 3789 feet sub sea. Top of oil sand was logged at 4087 feet, or 3761 feet below sea level. The well gauged 77 barrels of oil on eight-hour test through one-eighth-inch choke on tubing.

In the Long Lake field, southwestern Anderson County, Tide Water Oil Company and Texas Seaboard Oil Company's John Smith 1, John Adams Survey, near center of unitized block of 100-acre royalty interests and north of oil production, failed to encounter oil sand in drilling to the water zone at 5453-65 feet. Water was found at a sub sea depth of 5158 feet. The hole has been plugged back to 5279 feet, and casing set at 5180 feet to complete as a gasser.

Kansas Completions

Company, Well and Location	Init Prod. Bbls.	Depth
BARTON COUNTY—		
Wolf Creek, Kraft 1, sw sw sw 26-16s-11w	*	3421
McMorrow & Spencer, Hagen 1, ne ne ne 33-20s-11w	*	3548
CHAUTAUQUA COUNTY—		
National Ref. Co., Newman 34, cse nw 16-35s-10e	*	1544
CLAY COUNTY—		
Seavers, Myers 1, ne nw nw 4-10s-4e	*	1834
ELLSWORTH COUNTY—		
Lario O&G Co. et al, State 1, sw sw sw 29-15s-8w	*	3003
Atlantic, Rolfs 4, sw ne se 14-17s-9w	1260	3199
Empire, Rolfs 1, se se ne 14-17s-9w	1451	3195
Magnolia, Andrea 4, s½ ne nw sw 7-17s-10w	*	3400
GREENWOOD COUNTY—		
Young & Reynolds, Ott 2, se nw sw 7-22s-13e	107	1115
HARVEY COUNTY—		
Shell, Schmidt 2, ne se ne 5-22s-3w	71	3520
Sinclair Prairie, Marteris 8, sw nw se 19-22s-3w (pb 3238)	*	3655
KINGMAN COUNTY—		
Jarvis et al, Morrisse 1, cse ne 23-30s-10w	lcn.	abd.
MARION COUNTY—		
Phillips, Cowman 1, sw nw sw 11-17s-4e (pb 2381)	*	2405
White Star Oil Co., Doyle 1, cnw nw 20-21s-5e	*	2357
McPHERSON COUNTY—		
Dickey Oil Co., Gustafson 1, se sw nw 30-18s-2w	88	2351
Shell, Lovett 4, s½ sw nw nw 13-19s-2w	100	3381
Ogden Brothers, Sophie Chindberg 1, ne se nw 18-19s-2w	80	3017
Dickey Oil Co., Tull 3, ne se sw 13-19s-3w (pb 3015)	153	3020
Lario & Shell, Neufeldt 2, nw sw nw 34-21s-3w (otd 3472)	*	3685
NESS COUNTY—		
Glenn Cole et al, Tenny 1, ne nw se 19-18s-25w	lcn.	abd.
RENO COUNTY—		
Barnsdall, Sabin "A" 2, ne se nw 11-23s-4w	1145	3623
Sabin "B" 11, ne sw ne 11-23s-4w	1180	3587
Sinclair Prairie, Harner 5, nw ne sw 14-23s-4w	lcn.	abd.
Olson & Shell, Johnson 2, cnw nw 24-23s-4w	10-10	3368
T. M. Deal, McElwain 6, sw se se 34-23s-4w	209	3594
Texas, Carmichael 1, csw sw 10-24s-4w	255	3380
RICE COUNTY—		
Allison & Fitzwilliams et al, Stumps 1, nw nw sw 4-18s-10w	624	3267
Keith et al, Volkland 2, ne ne se 20-19s-9w	924	3260
Lebow et al, Doll 1, se se sw 20-19s-9w (otd 325)	1116	3262
Sinclair Prairie, Volkland 5, sw sw se 20-19s-9w (otd 3223)	1160	3245
Ramsey, Ira 4, ne nw nw 32-19s-9w	346	3301
Foraker-Nickerson et al, Lyon 1, se se ne 27-20s-8w	*	3617
Ramsey et al, Hilton 1-A, se se sw 6-20s-9w	998	3287
RUSSELL COUNTY—		
Liggett, Chrisler 1, sw nw sw 9-11s-15w (otd 3105)	115	3280
Stanolind, Baxter 31, sw sw se 32-13s-15w	46	3101
Billings et al, Witt 3, nw nw se 4-14s-15w	1025	3065
Phillips, Holland 3, ne sw sw 13-14s-15w	lcn.	abd.
Lario O&G Co. et al, Neidenthal 2, se ne ne 23-14s-15w	lcn.	abd.
Signal Oil Co., Sellens 2, ne se nw 26-15s-13w	465	3267
Hershey & Ashby, Eichman 1, nw nw se 34-15s-13w	435	3326
Sinclair Prairie, Sellens 1, ne ne ne 35-15s-13w (otd 2965, pb 3090)	413	3104
SEDGWICK COUNTY—		
Johnson & Atlantic, Cook 2, nw ne sw 20-28s-1e (pb 3113)	819	3114
Magnolia, Robbins 8, ne nw se 20-28s-1e	549	3105

Company, Well and Location	Bbls.	Depth

East Texas Completions

Company, Well and Location	Init. Prod. Bbls.	Depth
JOINER AREA—		
Amerada & Deep Rock, Stovall 20 (193.86-ac)	7000	3647
Big Indian Synd.(T. B. Reese, Rec), Wolford 8 (40-ac)	7000	3716
F. H. Brown et al, Lelia Tipps 2 (22.4-ac)	480	3630
R. W. Cole et al, Georgie Moore 1 (25.74-ac)	6500	3872
Combined Oil Ints., G. W. Eaton 27 (100-ac)	7200	3741
R. H. Dearing & Son, A. P. Finney 9 (39.7-ac)	†	3719
E. McDavid 2 (78.6-ac)	600	3733
F. W. Fischer et al, G. W. Eaton 2 (½-ac)	7000	3790
Florence Oil Co., Jessie Cole 2 (10-ac)	5000	3770
Gulf, W. O. Alford 7 (157.05-ac)	5000	3807
W. B. Hinton et al, Arterberry-Jackson 2 (12.95-ac)	8000	3817
Humble, Lulu Barton 8 (62.23-ac)	11,000	3751
A. D. Blackwell 39 (325.79-ac)	11,500	3703
S. A. Plowman 40-A (228¼-ac)	6800	3728
Hunt Prod. Co., C. D. Ashby 13-C (99-ac)	300	3666
M. M. Barksdale 5 (18-ac)	9600	3721
H. L. Hunt (C. M. Joiner) et al, Bradford 12-B (98.15-ac)	300	3695
R. F. Lane et al, D. E. Tyiska 3 (50-ac)	1500	3843
Prince Bros. Drl. Co., Arterberry-Jackson 2 (11.26-ac)	4600	3843
A. J. Sanders et al (was J. B. Patty Oil Co.), Geo. Cole 1 (5-ac)	7200	3851
Sun, O. W. Knight 25 (272.9-ac)	7000	3637
H. A. Pace 11-B (637.45-ac)	2000	3783
Texas, 1st State Bank (Overton) 17 (160-ac)	6000	3760
Venable Oil Co. & McClanahan, Birdwell 29 (147.04-ac)	10,000	3631
Birdwell 31 (147.04-ac)	10,000	3640
W. A. Weise et al, S. S. Cook 4 (9½-ac)	8400	3746
KILGORE AREA—		
Arkansas F. O. Co., Hughey-Ross 20 (220-ac)	7000	3584
Atlantic, M. B. Hughey 14-B (100-ac)	9500	3616
Droppleman Drl. Co.-St. Germain, L. Martin 3-A (22-ac)	10,400	3729
Empire, V. L. Taylor 2 (40-ac)	8000	3681
Gulf, H. C. Alexander 30 (209.01-ac)	6000	3568
W. F. Florence 18 (165.09-ac)	7200	3766
C. M. Jernigan 13 (88.82-ac)	9000	3664
J. H. Palmer 3 (8-ac)	9600	3591
J. B. Watson 14 (92.97-ac)	8500	3591
H. C. Hensley et al, Tom Bell 2-B (7¼-ac)	4600	3677
Invincible Oil Co., Will Williams 8 (14-ac)	10,000	3646
Iowa Payne Oil Co., W. B. Walker 5 (42.33-ac)	9000	3659
Kilgore Ref. Co., I&GN 9 (19.58-ac)	3500	3604
Roger Lacy et al, Isiah Adkins 6 (8-ac)	8500	3658
A. N. Landes et al, J. B. Watson 1	1000	3565
John W. Luttes et al, M. Register 3 32.047-ac)	7000	3693
Navarro Oil Co., R. N. Brightwell 18 (113.08-ac)	9000	3658
OK Producers Corp. (was Winona Oil Co.), C. Wells 2 (49½-ac)	8500	3721
Producers Inv. Corp., R. H. Rowland 2 (5.71-ac)	360	3595
Republic Prod. Co., J. H. Scroggins 6	5800	3683
Shell, P. M. Bates 12 (64.96-ac)	6500	3617
J. H. Spivey 11 (102.45-ac)	8000	3755
Snowden & McSweeney Co., R. H. Laird 21 (133.1-ac)	8800	3601
Stanolind, Lillie Morse 5 (12½-ac)	8500	3648
Sun, Calvin Brown 11 (100-ac)	9600	3674
Tide Water, M. G. Barton 24 (194-ac)	11,000	3590
J. S. Bean 15-A (128.44-ac)	7500	3631
Trapshooter Reilly O&Roy. Co. (L. J. Wardlaw, Rec.), Mitchell 3-A (6.6-ac)	5500	3615
LONGVIEW AREA—		
Amerada Pet. Corp., Catie Bumpas 10 (98.3-ac)	7500	3575
Cont'l Bank 14 (98.3-ac)	7200	3595
Arkansas F. O. Co., V. Calvin 9 (65.22-ac)	9200	3549
D. B. McPherson 5-A (26-ac)	11,000	3584
E. M. Whatley 5 (43.91-ac)	9500	3543
Atlantic, J. C. Judge 72-A (455-ac)	11,000	3528
J. C. Judge 77-A (455-ac)	9800	3528
Atlantic & Sun, M. Hays 61-A (448-ac)	10,500	3531
Atlantic & Wadley, T. W. Lee 13 (110-ac)	11,500	3630
Barnsdall Oil Co., M. Adams 15 (102.65-ac)	8200	3635
M. Adams 16 (102-65-ac)	9000	3626
J. B. Bond et al, Wm. Cobb 4 (7.73-ac)	10,000	3686
Clark & Cowden Drl. Corp., J. M. Christian 9 (42¾-ac)	8500	3665
Delta Drl. Co., M. C. Salter-Brawley 1 (51-ac)	7000	3774
Farrell & Co. (was R. W. Bond-Rhodes), J. M. Christian 2-A	4600	3628
Galvez Oil Corp., W. W. Holland 8 (45½-ac)	4000	3675
Gulf, J. C. Judge 63 (518.3-ac)	5500	3512
J. C. Judge 69 (518.3-ac)	5300	3512
A. W. Henderson et al, Sabine Negro Church 1 (1-ac)	5500	3556
H. B. Howze et al, Boyd-Smith 1, blk 31	500	3642
Humble, J. M. Adams 8 (99.94-ac)	7500	3492
Jones & O'Brien, Inc., McHaney-Loeb 7 (39.82-ac)	9000	3557
Magnolia, W. N. Blackwell 11 (90-ac)	8600	3715
Carrie Brooks 7 (50-ac)	4500	3614
Navarro Oil Co., T. B. Harris 11 (80-ac)	4600	3539
New Process Prod. Co., Geo. Anderson 8 (8.61-ac)	7200	3526
B. F. Phillips et al, W. Starr 3 (30-ac)	5000	3627
Producers Pet. Corp., T&P Ry. 2 (3-ac)	8400	3636
Selby O&G Co.-Lewis Prod. Co., Snavely 9-A (214½-ac)	8000	3567
Shell, A. N. & V. King 18 (160-ac)	8300	3610
Skipper & Bivins Oil Co., M. Magrill 4 (12-ac)	9500	3654
Stroube & Stroube, Mackey-Humble 22 (314.6-ac)	2500	3654
Sun-Texas Seaboard, J. M. Haynes 28 (203-ac)	8400	3589
Texas, D. Culpepper 4 (61.57-ac)	750	3748
Yount-Lee, J. D. Davis 13-A (80.68-ac)	8800	3622
T. M. Whatley 7-A (51.76-ac)	7500	3509
Miscellaneous		
ANDERSON COUNTY (Cayuga Field)—		
Clark & Cowden Drl. Corp., J. W. Barton 1 (9.86-ac)	5000	4115
Wildcats		
CHEROKEE COUNTY—		
Ponta Oil Co. et al, C. W. Darley 1	*	4550
UPSHUR COUNTY—		
Thos. D. Humphrey et al, Claude Nation 1	*	3720
HARRISON COUNTY (Waskom)—		
Socagee Oil Corp., Vaughan 6, W. R. Anderson sur	¶	961

*Failures; †Junked; ¶Million cu. ft. gas.

Four Wildcats to Be Drilled in Wood County

Tyler, Texas.—Projected wildcats for immediate drilling in western Wood County, situated in the north portion of the Woodbine sand belt in East Texas, were increased to four the past week when Dean Brothers, Albert Adkisson, Fort Worth operator, and associates made location on a block of 2000 acres near the center of the west line of the county. Three blocks held by the Felmont Corporation (E. DeGolyer) and others near Alba, Quitman and Yantis are scheduled to be drilled simultaneously. The latter have been in the spotlight for several months by reason of major companies paying from $40 to $50 per acre for protection leases.

Dean, Adkisson et al have ordered rotary rig moved in to drill on the W. H. Finklea 175-acre tract, Benjamin Anderson Survey, about four miles east of recent failure drilled in eastern Rains County by Rio Oil Corporation, E. DeGolyer et al on the O. L. J. Easter 39-acre tract, R. Hotchkiss Survey. B. L. Phillips, Gladewater, will have an interest in this test, which will explore the Woodbine section.

Gulf Production Company, Shell Petroleum Corporation, Fohs Oil Company and others that bought acreage within The Felmont Corporation's blocks are reported to be basing their plays largely upon geophysical information. The test slated to be drilled on the R. M. Stone 40-acre lease, James Simpkins survey, about one mile south by west of Alba, situated in the southwest corner of Wood County, is favored most by lease and royalty buyers. It is considered in some circles as the "next oil strike" for East Texas. Each of the three tests are to be carried through the Woodbine section to the Georgetown lime, unless production is scored otherwise, according to reports.

Cherokee County

T. J. Wood and Young's New Birmingham 3, situated about 800 feet southeast of their discovery well of the Rusk pool, Cherokee County, had progressed to 2500 feet late last week. Their producer is pumping about 150 barrels of oil, plus 65 percent water from Woodbine sand at 5121-24 feet, or 4692 feet below sea level, and has marketed approximately 55,000 barrels of oil since first placed on production early last June. The second test, situated to the southwest, proved dry. Cal T. Scott and Turpin have contracted to drill near the southeast corner of the Levi Jordan survey, site of the discovery well, having moved in

rig to the northwest of the W. T. Whiteman-E. M. Decker 30-acre tract, J. H. Armstrong survey. Stidham and Thrasher, contractors, were assigned a three-eights interest in the test and site, besides a cash bonus of $10,000 to drill the well.

Stewart and Egan, Tyler, are reported to have started moving in materials to proceed with a location made last July in southwestern Rusk County and on a block straddling the Rusk-Cherokee County line. Location is in the NEc block 12, Jose I. Sanchez survey, and on the Hall Wood 847-acre tract.

Appearance of salt water in a series of formation tests made from the Woodbine section in Hunt Production Company and Sun Oil Company's Alice Scott-Pure 1, Slocum area, Anderson County, definitely removed this project as a contender for discovery honors. First Woodbine sand was logged at 5266 feet, with an elevation of 411 feet. The test yielded water at 5277 feet and again at mile depth, with the same results at 5306 feet.

Limestone County

W. A. Reiter, Mexia geologist, and associates have moved in materials to drill a wildcat in Limestone County about 2½ miles southwest of the Mexia field and near the center of a 500-acre block. Location is on the J. Minor Tidwell 230-acre tract, and near old failures drilled by Magnolia Petroleum Company on the Kennedy tract, and by Hicks, Hunt & Hoover on the Priddy tract. Both recorded oil showings prior to drilling into water section of the woodbine.

Second East Texas Extension in Upshur

Tyler, Texas.—Delta Drilling Company, Longview, scored its second important extension along the northwest flank of the East Texas field in Upshur County in completing R. A. Adkins 2, SEc of 123-acre lease, Wm. King Survey, flowing 60 barrels of oil hourly through open tubing from sand at 3736 feet, or 3337 feet below sea level. It is 3640 feet and two locations east of the company's recent extension on the Hamilton tract, which was completed at 3776 feet, or about 3312 feet sub-sea. The new outpost well is producing from a secondary sand found below the usual water table for the field proper, and is considered erratic.

Deepest Drilled Hole Testing Oil Show

San Angelo, Texas.—Production test was in progress late last week on the deepest drilled hole as result of the recovery of extremely porous gray and dark limestone cores registering positive odor and color of petroleum in Gulf Production Company's J. T. McElroy 103, with the hole bottomed at 12,720 feet, or 10,095 feet below sea level. Officials of the company refrained from venturing a guess as to whether the well would yield oil and gas or water when the task of unloading the record depth hole is completed.

No showings were reported in lowering the column of drilling fluid carried in the 10,301-foot string of 7⅝-inch pipe to three quarters of a mile below the surface. The hole is being unloaded by swabbing through 2½-inch tubing lowered to the bottom of the casing.

Unless the well proves barren at its present depth, the company is not likely to endeavor to extend its record of penetrating a greater distance below the surface than heretofore attained by drilling or mining. The test reached its projected goal, the Ellenberger limestone member of the Lower Ordovician series, at 12,664 feet.

Operations were started March 21, 1933, and the hole has been carried 1374 feet into the Ordovician series, topped at 11,346 feet. Using four rotary crews in six-hour shifts, the company has scored a record in avoiding major fishing jobs in spite of the unusual number of cores taken and the extreme hardness of the formations encountered. Ten-foot core taken at the bottom of the hole scored 100 percent recovery.

North Texas Completions

Company, Well and Location	Init Prod. Bbls.	Depth
ARCHER COUNTY—		
Continental, Falls County 18-B	450	1186
Falls County 19-B	245	1126
W. J. Logan 8-A	95	1192
A. R. Dillard et al, B. G. Hasson 2, blk 156	*	1540
Fain-McGaha Oil Corp., L. F. Wilson 1-C, sec 94	*	1600
FHE Oil Co., F. Brazina 6, sec 2410	15	1445
F. Brazine 7, sec 2410	30	1445
W. T. Richardson 6, sec 2424	35	1441
W. T. Richardson 9, sec 2424	9	1440
Florey Oil Co., F. Brazina 3, sec 2410	30	1440
Foster et al, S. L. Scott 1, blk 15	*	1245
W. B. Hamilton Pet. Co., W. Pace 26, blk 100	25	1161
Martin & Hines, Wm. Justice-Conoco 2	18	1083
W. E. Maxson & Panhandle, F. C. Green 36-B	25	1098
F. C. Green 37-B	30	1103
Magee & Stipe, Wm. Justice 4, blk 6	5	1082
Peery & Booler, W. T. Richardson 1, sec 2424	*	1460
W. T. Richardson 3, sec 2424	10	1443
Perkins-Cullum Oil Co., Abercrombie 14, sec 157	30	1227
Falls County 164, blk 3	8	1196
Falls County 168, blk 6	70	1161
Falls County 170, blk 19	30	1094
Falls County 171, blk 11	60	1155
Falls County 172, blk 19	300	1107
Pet. Producers Co., L. W. McCrory-Wilson 1, sec 114	*	1565
Ray & Staniforth, W. T. Richardson 1, sec 2424	*	1467
W. T. Richardson 5-B	75	1608
P. O. Rogers et al, J. Darilek 1, sec 2410	55	1444
White & Duncan, I&GN Ry. 5-B, blk 4	5	722
BAYLOR COUNTY—		
W. N. Alexander et al, W. H. Portwood 1, sec 1587	135	1592
Consolidated Pet. Co.-Pet. Producers Co., Portwood 3-D, sec 1587	200	1378
DENTON COUNTY—		
Christie Bros. & Grant, J. H. Hughes 1	*	1245
JACK COUNTY—		
G. B. Gaines et al, W. H. Smith 3	*	293
MONTAGUE COUNTY—		
O. V. Beck et al, C. L. Davenport 17	170	1696
Benton & Holmes, Davenport 8-B	400	1692
W. A. Reed 2	75	1732
WICHITA COUNTY—		
Bonner Oil Co., Watkins 6, blk 10	10	856
Burk Royalty Co., 1st Nat'l Bank 8, blk 44	*	846
J. H. Cottom et al, Chilson 1, blk 3	*	798
Flynn Bros. et al, W. C. Williams 1	*	768
Horwitz & Oldham, D. E. Hooks 2	30	1186
Texas, 1st Nat'l Bank 21, sec 26	3	469
United Oil Corp., L. P. Douglas 15	*	821
WILBARGER COUNTY—		
Hegralle Oil Co., Waggoner Est. 12-A, sec 35	340	1879
T. Medders et al, Waggoner Est. 1, sec 34	*	2475
Riner & Massie, Waggoner Est. 13-A, sec 22	350	1876
A. B. Wharton et al, Waggoner 5-A, sec 34	25	1887
YOUNG COUNTY—		
Dinny Oil Co., R. J. McCloud 1, sec 1395	*	923
Clara Mae Douglas et al, Finch 4, sec 40	70	651
B. N. Honea et al, W. L. Groves 1, sec 1491	*	970
C. B. Long et al, H. C. McKinney 2, sec 1367	*	963
L. A. Long et al, R. A. Kutch 1	35	1707
Martin & Hines, J. Bullock 1, sec 261	10	675
McLester Oil Co., A. C. Owens 1	*	3260
Mook-Texas Oil Co., Jeffery 1-B, sec 52	*	888
Rathke Oil Co., C. E. Graham 10, sec 3401	25	914
E. R. Riggs et al, B. H. Larrimore 3-C, sec 2247	*	673
Texas, Finch 8-B, sec 40	10	672
Westheimer & Daube, B. Larrimore 12, sec 2247	9	653

*Failures; †Junked; ¶Million cu. ft. gas.

Second Ector County Area Producer More Prolific

San Angelo, Texas.—The Scharbauer ranch structure in northwestern Ector County scored its second and most prolific producer late Wednesday when Gulf Production Company's C. Scharbauer-Goldsmith 1, C NW Section 10, Block 44, T&P Ay. Survey, T-1-S, flowed by heads at one hour intervals at estimated rate of 500 barrels of 36.2 gravity oil and 1,500,000 feet of gas daily from saturated lime at 4172 feet, or 1060 feet below sea level. The producing horizon was penetrated about two feet, and the flow of oil followed the pulling of the cable tools from the hole. The well is in the center of the north portion of a 19,840-acre leasehold, and 2¾ miles southeast of Landreth Production Corporation et al's discovery well on the Scharbauer ranch, which was completed last November rated at 40 barrels of oil and considerable gas after plugging back from sulphur water at 4223-36 feet to 4186 feet, or 1024 feet sub-sea.

Lease contract on Gulf Production Company's large block was due to expire next August. The company has a solid row of sections extending east and west immediately north of its producer and between the large joint interest block held by Landreth Production Corporation et al. Pure Oil Company holds leases on eight solid sections adjoining Gulf Production Company's block on the east.

Pipe line outlet for the Scharbauer area will not be difficult, as Atlantic Pipe Line Company and Magnolia Pipe Line Company have trunk lines nearby, while Gulf Pipe Line Company's nearest carrier crosses the Judkins-Connell field, situated 15 miles south of the new producer.

Gulf Production Company has ordered two 500-barrel steel tanks erected at its Scharbauer-Goldsmith well, and will drill deeper into the lime when tankage is available. Another string of casing may be landed, as the hole is open below 3750 feet, where a protection string of 8⅝-inch pipe was cemented because of the presence of gas, testing 1465 pounds pressure, in the upper section of the lime. Other than a small amount of live oil logged at 4135-40 feet, no oil production was encountered by Gulf Production Company prior to striking the porous lime at 4170 feet, or 425 feet below the top of the brown lime section. Landreth Production Corporation et al's discovery well of the structure, logged oil pay at 4102 feet, or 392 feet below the top of the brown lime marker, with 5 3/16-inch casing cemented at 4108 feet because of excessive gas production near the oil contact. The new producer is 118 feet lower on structure, and by reason of being on the flank failed to encounter heavy gas immediately above the oil zone.

Territory to the north and northwest of Landreth Production Corporation et al's Scharbauer producer has been considered the most likely production trend. This theory was largely pred-

West Texas Completions

Company, Well and Location	Init Prod. Bbls.	Depth
CRANE COUNTY—		
Continental Oil Co., Cowden 3-C....	15	2560
HOWARD COUNTY—		
Shasta Oil Co., G. M. Dodge 1.....	280	2821
JONES COUNTY—		
Dr. C. E. Johnson et al, W. T. Young 1	*	2003
Robb & Brewer, M. Evans 1	*	2020
Shappell Oil Co., J. J. Steele 1	*	2250
WARD COUNTY—		
The California Co., A. B. Gordon 5	1079	2552
Sid Richardson et al, Johnson-Sun 20-B	491	2588
Johnson-Sun 21-B	484	2590
TP Coal & Oil Co., Henry James 9..	12	2560
WINKLER COUNTY—		
Joe C. Maxwell-Atlantic O. P. Co., L. Dougherty 2	563	2954
Sid Richardson et al, Scarborough 2-G	193	3010

*Failures; †Junked; ¶Million cu. ft. gas.

Texas Panhandle

Company, Well and Location	Init Prod. Bbls.	Depth
CARSON COUNTY—		
Hagy-Harrington & Marsh, H. Barnard 4	¶35	2745
J. G. McClintock & Sw Oil & Dev. Co., Brown-Jordan-Garner 3 ...	15	3144
Magnolia, Fee (No. 244) 9	615	3032
COLLINGSWORTH COUNTY—		
Humble, B. P. Smith 1-A	*	4525
GRAY COUNTY—		
Dixon Creek O&R Co.-E. B. Hopkins, W. Benedict 4	440	3287
Magnolia, W. Harrah 6	208	3210
Stanolind, A. J. Culler 2	540	3304
Sun Oil Co., Combs-Worley 8-A ..	605	2984
Texwell Oil Corp., J. C. McConnell 2	135	3312
HUTCHINSON COUNTY—		
Gulf Prod. Co., J. A. Whittenburg 7-B	208	2996
Huber Pet. Co., Johnson 4-C	419	3087
Phillips Pet. Co., Cockrell-Ludlum 2	145	3028
Stinnett Oil Co., W. A. Starnes 1..	†	570
WHEELER COUNTY—		
El Bar Corp., J. M. Noel 7	20	2441
Helena O&G Co., P. M. Keller 3....	2920	2481
Skelly Oil Co., D. E. Johnson 2 ...	6280	2485
The Texas Co., P. M. Keller 11....	2500	2535
Triplex Oil Co. (was J. G. Cloud), A. Plummer 1	35	2478

*Failures; †Junked; ¶Million cu. ft. gas.

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icated on the fact that C. J. Davidson and Atlantic Oil Producing Company's H. E. Cummins 1, C NW NW Section 10, Block 45, T&P Ry. Survey, T-1-N, 6½ miles to the northwest, developed a 50-barrel spray of oil with 8,000,000 cubic feet of gas after shooting with nitro and treating with acid. The latter was completed last July at 4509 feet, or 1215 feet below sea level. First oil was logged at 4267 feet, or 973 feet sub-sea, and top of brown lime was reported at 461 feet sub-sea. Empire Gas & Fuel Company's Cummins 1, in the southeast corner of this original northwest Ector County producer, is drilling below 3830 feet. Landreth Production Corporation et al's Cowden et al 1, SWc Section 18, Block 44, T-1-N, several miles southeast and 3¼ miles northwest of the Scharbauer well, was drilling at 4142 feet late last week, and the same interests' Scharbauer 1-A, SEc NW¼ Section 13, Block "A", PSL Survey, had progressed to the 2250-foot level in seeking to extend the Scharbauer area 1½ miles to the north.

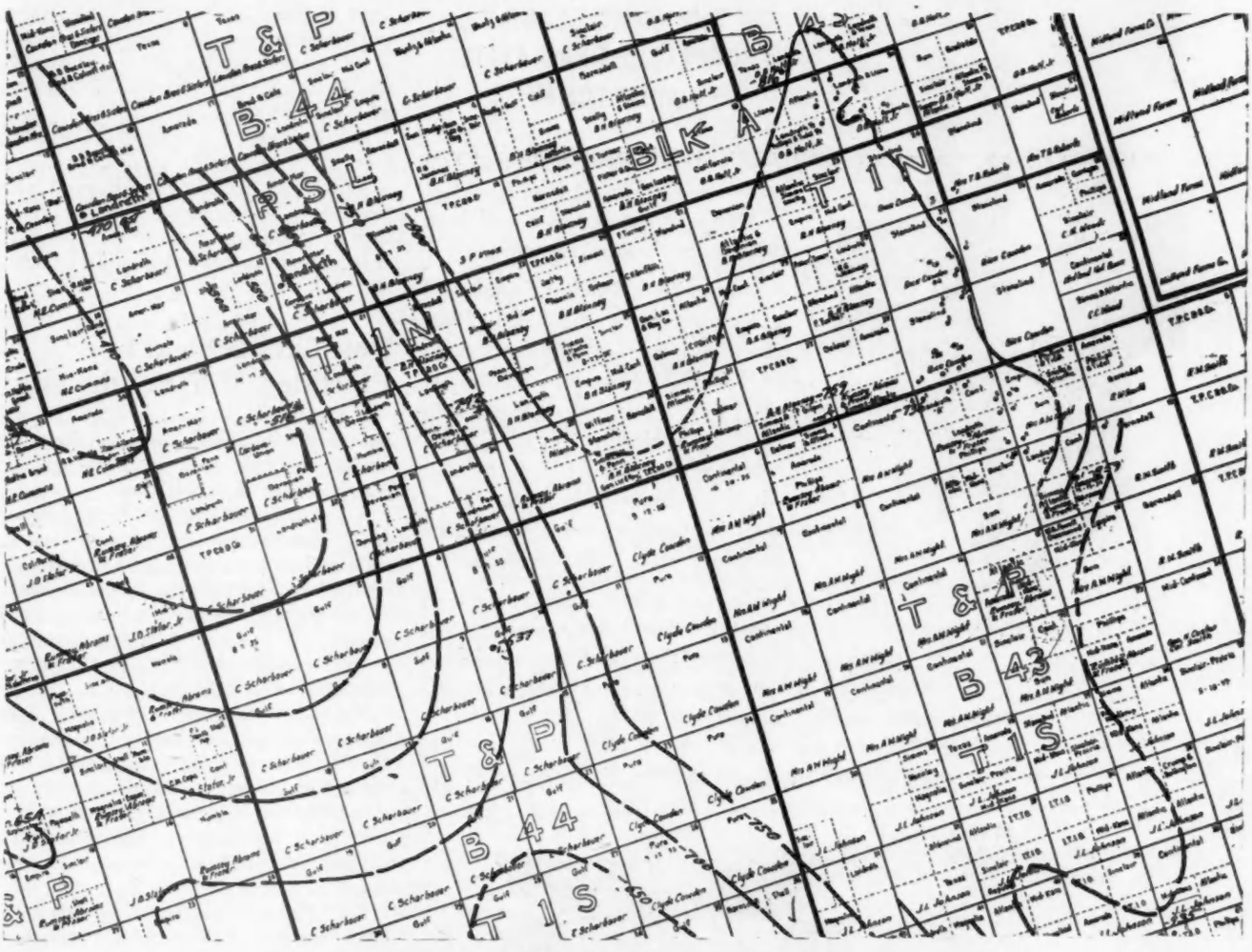
Rotary rig has been ordered installed on Sid Richardson et al's J. B. Walton-Pure 1, Winkler County wildcat, due to gas production having increased to about 30,000,000 feet daily in drilling to 2945 feet, or 830 feet below the top of the brown lime section. Occupying the highest structural position recorded in the county, this wildcat is due to reach a decisive depth for oil production near the 3100-foot level. Progress has been slow in drilling with cable tools in a loaded hole. Gas began appearing behind 8¼-inch protection string of casing landed at 2318 feet early last week, making it necessary to take extra precaution against a blowout. Top of brown lime was logged at 2115 feet, or 832 feet above sea level. The well is five miles southeast of the Scarborough field and same distance northeast of the Sayre field. Gulf Production

R. W. Clark and others have made location for a Reeves County wildcat to be drilled on the Radford Grocery Company fee, located 340 feet from the east and 2640 feet from the north lines of Section 39, Block 59, PSL Survey, situated in the western part of the county.

West Central Texas Completions

Company, Well and Location	Init Prod. Bbls.	Depth
BROWN COUNTY—		
E. M. Kirkpatrick et al, M. Bowden 1	*	2492
E. Selvidge et al, fee 1	*	1330
Emmett Whiteside et al, Mrs. O. H. Nichols 7	*	816
COLEMAN COUNTY—		
C. W. Armstrong et al, G. M. Gray 1	*	2560
EASTLAND COUNTY—		
Murry & McDavid, L. E. Murrell 1	50	1305
SHACKELFORD COUNTY—		
Charter Oil Co., N. M. Mills 1-B	*	1627
L. H. Choate et al, H. McKeever 1	*	1705
Dean & Adkisson, Dell Newell 1	*	1400
D. W. Machie et al, T. W. Lee 15-B	*	1021
Owens-Snebold Oil Corp.-FHE Oil Co., Reynolds-Gulf 8	140	1081
Roeser-Pendleton, Inc., Dawson 8	25	1621
Roeser-Pendleton & Conoco, Cook 54-A, sec 61	30	1228
Roeser-Pendleton & Humble, Morris-Buie 22, sec 201	15	1627
T. K. Simmons et al, B. C. Harvey 10	100	1740
W. F. Snebold et al, T. W. Lee 1	*	1206
STEPHENS COUNTY—		
T. G. Shaw Oil Corp., Chesley 2	*	241

*Failures; †Junked; ¶Million cu. ft. gas.



Showing location of Gulf Production Company's prolific new strike in northwestern Ector County.

Loma Novio Field Is Again Extended 1½ Miles

San Antonio, Texas.—Loma Novio field, Duval County, received another one and one half-mile extension. This followed an extension of similar distance last week.

Smith and Hamil's M. C. Hubbard 1, in the southwest corner of Section 77, cored sand at 2664-78 feet and showed 750 feet of oil with 50 pounds pressure on a drill stem test of 20 minutes duration. Casing has been set and the completion will be effected within the next few days.

This well is one and one half miles southwest of Tex-La Oil Corporation's M. C. Hubbard 1, southwestern portion Section 84, which several days ago extended the field the same distance due south. The latter well is standing more than 1500 feet in oil, but has not built up enough pressure to flow. It had a dry sand cap at 2789-95 feet and oil sand at 2795-2803 feet. The well likely will be put on pump.

Bridwell Oil Company's Sutherland 2, Section 122, which established oil production in the Hoffman field, still farther south of the Loma Novio field, has finally been completed. It is estimated at 15 barrels an hour through three eights-inch choke on tubing from sand at 2701-18 feet.

The trend of activity as a result of these new extensions embraces an area about eight miles in length, north and south and several miles in width. A number of new semi-wildcat tests are starting and deals for acreage are expected to bring about a rather rapid drilling campaign.

Discovery well in the new Seven Sisters field, northeastern portion of the county, has been pumping an average of 73 barrels per day for the past week. It is Harvey & Henderson et al's Chernoskey 1, Section 226. The well drilled to 2650 feet, but plugged back to 2226 feet, where it was completed in sand topped at 2220 feet.

Humble Oil & Refining Company has commenced Bank of Fredericksburg 1, Section 382, one mile southwest of the well, while Harvey & Henderson have started R. Serna 1, Section 384, a southwest offset to the discovery well. Santa Clara Oil Company's Wood-Welder 1, one mile south of the discovery, is drilling at 1523 feet.

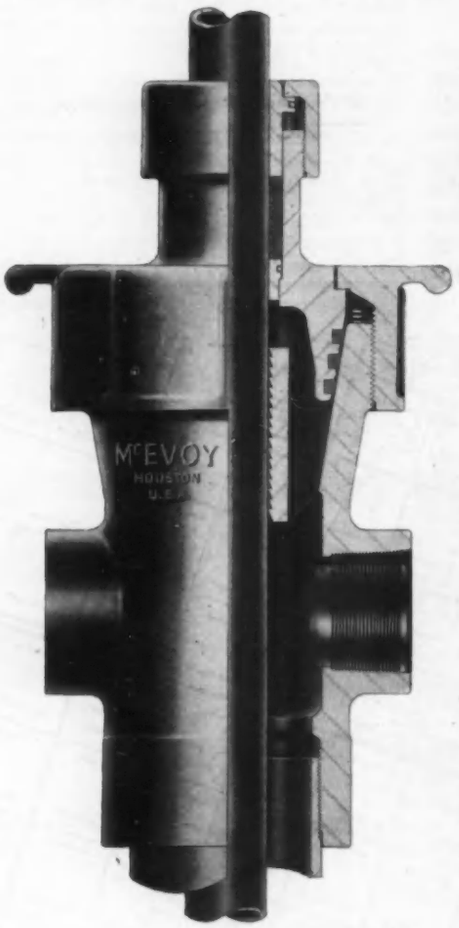
Intrepid Oil Company's Parr 2, northwest of San Diego and in the extreme northeastern portion of the county, gives some promise of production in the Hockleyensis. It showed 350 feet of oil and 500 feet of salt water on a drill stem test at a total depth of 4072 feet. It is believed that the salt water is coming from above the sand and the hole is being reamed down preparatory to making a new test. The well is in the south central portion of Section 115.

Port Lavaca Field Is Extended Mile Southwest

San Antonio, Texas. — Port Lavaca field, Calhoun County, was definitely extended one mile southwest, through the completion of a second crude producer, The Texas Company's W. H. Wehmeyer 1, M. Sanches Survey, making between eight and 10 barrels per hour through ¼-inch choke and showing tubing pressure of 350 pounds and casing pressure of 850 pounds. It was drilled to 6336 feet, but plugged back to 6259 feet, seven-inch casing being set at 6251 feet.

The same company's Martin 1, four miles southwest of the field, is making a drill stem test of a sand at 6323-29 feet. Conflicting reports are current on this well, but it is understood that it is running a little higher than other tests in the field, indicating a possible producer.

The Texas Company's Duelburg 1, about one half mile west of the discovery oil well, had one foot of sand at 6377-78 feet, and on a drill stem test from



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6368-78 feet, showed four fourbles of salt water. It is to be plugged back to the upper sand, where further tests will be made.

Several miles south of the discovery, The Texas Company's Blardone 1 is coring shale at 6535 feet. Halliburton Oil Producing Company's D. Burton 1, east offset to the discovery oil well, is testing at 6240 feet.

A number of new operations commenced during the week. Crown Central Petroleum Corporation staked four locations on the Willett Wilson Estate, between the discovery oil well and the discovery distillate well, and has started active operations on one. Halliburton has made several additional locations, none of which have been announced.

Adrian Moore is spudding McMaster 1, west of the discovery. Steinberger Petroleum Corporation staked six locations on the Hartman tract near the discovery well, and another on the Shofner discovery tract.

Wildcat Indicates New Field in Hidalgo County

San Antonio, Texas.—DMC Oil Company's Daskam 1, about four miles northeast of the Samfordyce field, Hidalgo County, has set five-inch casing to its total depth of 4414 feet, and will perforate from 4102-14 feet. This is a wildcat, showing for the third producing area in this county.

The well is in the southeast corner of Block 34, Porcion 45, and is in an area where a number of wells have been drilled, the majority being to shallower levels than this new test.

It encountered a gas sand at 4090-4100 feet, lime cap at 4100-4102 feet, and oil sand to the total depth. An electric formation testing device was run, indicating a producer.

Two miles to the south, Nedler and Graham's Daskam 1, near the center of Block 42, Porcion 45, is rigging up. It will test the same horizon.

The Samfordyce field, discovered last September, has approximately 60 oil wells from between 2700 and 2800 feet. There are nine active wells in the field at this time.

H. J. Porter et al's Smith 1, in the extreme southeast portion of the field, perforated at 2752-57 feet in the upper sand, but showed nothing. It will perforate again. Smith & Devault's Seabury 1, western portion of the field, is a producer through perforations at 2813-15 feet, but not gauged. It is about an average well. The total depth is 2915 feet. Rogers Oil & Gas Company's F. B. Guerra 4 is rated as four barrels per hour through ⅛-inch choke, showing 220 pounds tubing pressure and 400 pounds casing pressure.

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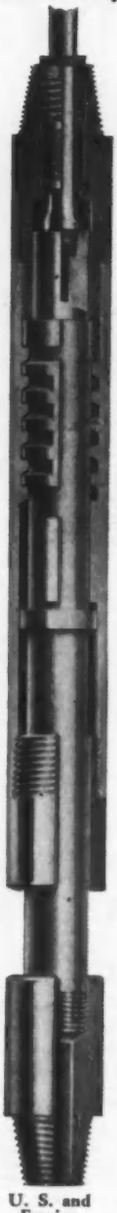

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Carolina-Texas Field Gets Queen City Sand Oil

San Antonio, Texas.—Carolina-Texas Oil & Gas Trust's Benavides 11, Section 683, in the Carolina-Texas field of Webb County, is spraying slightly more than two barrels of 42.5 gravity oil per hour from 4374-96 feet, definitely establishing oil production in the Queen City sand of the Mount Selman formation, the first for this field.

The well was showing a large volume of gas and has a pressure of about 725 pounds on the tubing and 1425 pounds on the casing. It is being worked upon to lower the gas volume.

Several wells are completing in the Bruni townsite area of the Cole field, also in Webb County. American Liberty Oil Company's Bruni 2-C, drilled to 3427 feet, plugged back, and is in process of completion. Highland Oil Company's Bruni 8 is a completion at 3387-94 feet, but not gauged. O. W. Killam is completing Bruni 36 in sand at 3373-3410 feet.

Wildcatting Is Active In San Patricio County

San Antonio, Texas.—San Patricio County's new fields have brought a spurt of wildcatting activity to that county. Several new wells have been started and additional deals are being worked out to bring about several more tests to 6000 feet or deeper.

Heep Oil Corporation's E. H. Welder 1-E, about a mile southwest of the Plymouth Oil Company's Welder 1-C, discovery well, is reported to have encountered a sand showing oil around 5400 feet. The information is withheld, but rumors are to the effect that it is showing for a possible producer. The well is in the northeast corner of Section 46, Welder subdivision, but shown on most maps as being in the R. Montgomery Survey. A completion as a producer will materially extend the producing area of this field, which thus far has only one well.

Plymouth Oil Company's 2-C, one fourth-mile east of the discovery well, is drilling below 2300 feet, while 3-C, one-fourth mile north of the discovery, is drilling below 1800 feet. This field has been designated as the Plymouth pool by the nomenclature committee of the San Antonio Geological Society.

Down in the Sinton field, Plymouth Oil Company has finally succeeded in cutting down the gas volume in Welder 3-A. At last reports it was making 110 barrels of oil along with two million cubic feet of gas per day. The oil was increasing and gas decreasing. About a mile east of this well, same company spudded in Welder 1-D. Conroe Drilling Company is drilling Welder 1-E, about a mile north of the field. It is now making hole below surface casing.

Continental Oil Company & Atkins & O'Neil's J. F. Welder 3, nearly one half-mile northeast of the Angelita field discovery well, has been spudded. It is to be a deep test.

Williams et al of Sinton are preparing to drill a test just east of the town of Sinton. Several major and independent operators hold close in acreage and the test will be partly financed through bottom hole contributions on the part of these concerns.

New Pettus Sand Field Looms in Live Oak County

San Antonio, Texas.—A new Pettus sand field appeared in prospect late in the week as Henderson Coquat's H. E. Rex 1, Live Oak County, made a drill stem test at a total depth of 4375 feet. It is three miles south of the town of Mikeska and three miles north of McNeill field.

The well topped the Pettus sand at 4369 feet, had a hard cap at 4370-71 feet, and saturated sand at 4371-75 feet. It topped the Hockleyensis at 3582 feet. Derrick floor elevation is 284 feet.

Location is 330 feet from the southeast and southwest lines of the G. H. & H. Survey No. 1, Abstract 197.

The block originally was held by the Luling Oil & Gas Company, but a deal was made with Henderson Coquat to drill the test.

Two more producers are in the making on the Lion Oil & Refining Company's P. E. McNeill block. McNeill 6, 660 feet east of 4, had sand at 4358-86 feet, the upper portion showing gas and the lower showing oil. Casing has been set and cemented. McNeill 7, 660 feet west of No. 4, had sand at 4401-19 feet showing saturation, and has set casing. Darby Petroleum Corporation has spudded McNeill 1, 1200 feet southeast of the discovery well.

In the North Lucas area, Smith & Storey's Nueces Valley Townsite 1, north offset to the discovery is drilling below 4700 feet, while Marine Oil Company's Adair 1, one mile east of the discovery, is drilling at 3500 feet. Houston Oil Company's Cartwright 32, to the south and in the Lucas field, is coring at 5250 feet.

Houston.—W. C. Keeble's T. S. Foster 1, J. M. De La Garza Survey No. 11, Block 27, Montgomery County, was completed as a dry hole at 5230 feet on May 17, 1935. The test encountered the Cockfield at 4330 feet.

Two Placedo Tests May Show Importance of Area

San Antonio, Texas.—Two wells are close to the sand in the new Placedo field of Victoria County, both sufficiently far from the discovery to indicate the importance of the producing area.

Costa Oil Company's J. E. Schovajsa 1, Lot 14, one mile southwest of the discovery, had a sand at 4757-69 feet carrying an odor. Four drill stem tests failed and the well was cored deeper to 4774 feet in sand. Nearly the same distance northwest of the discovery, Gillespie and Superior Oil Company's Farber 1, Lot 6, was drilling below 5700 feet.

The above operators have spudded in Brandt 1, south offset to the discovery well. Magnolia Petroleum Company is rigging up Henderson and Pickering 1, east offset to the discovery.

Plummer Drilling Company's J. Zimmer 4, in the Coleto Creek field, cored the shallow gas sand at 2182-86 feet and went into shale. It was coring the same formation at 2198 feet at last reports.

Three wells are drilling in the McFaddin district, in Victoria and Refugio Counties. The Texas Company's McFaddin 9, a deep test, is drilling below 3967 feet. Houston Oil Company's Fagan 1, also a deep test, is drilling below casing set at 1027 feet. Just across the line and in Refugio County, Humble Oil & Refining Company's M. M. Marberry 1 is drilling hard sand at 5217 feet.

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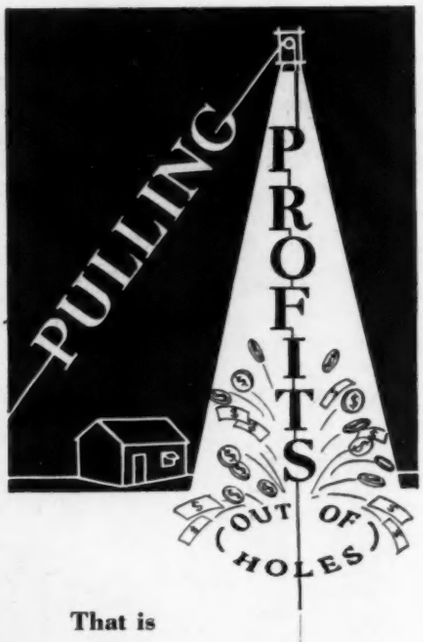
South Texas Completions

Company, Well and Location	Init Prod. Bbls.	Depth
BEE COUNTY—		
Mills Bennett, C. W. Bassinger 2, ne nw sec 7, Uranga gr (Dirks) ...	250	3848
Dirks Bros., J. E. Roth 2, nw sw sec 7, Uranga gr (Dirks)	400	3850
Home Corp, C. W. Bassinger 1, ne nw nw sec 7, Uranga gr (Dirks)..	350	3822
Edwin M. Jones, J. M. Japp 3-A, nw, sec 5, Uranga gr (W. Tuleta) . ..	200	3933
D. E. Robinson 10, sw sec 5, Uranga gr (W. Tuleta)	*	....
D. E. Robinson 11, sw sec 5, Uranga gr (W. Tuleta)	*	....
Peter Unzicker 1, se sec 6, Uranga gr (W. Tuleta) perf 3900-20	15	4276
BEXAR COUNTY—		
Tom Owens et ux, Fee 1, S. Jett sur No. 53 (Von Ormy)	4	700
CALHOUN COUNTY—		
The Texas Co., W. H. Wehmeyer 1, 1215 ft wl, 900 ft sl 289-ac tr, M. Sanchez sur, 1 mi sw field (Port Lavaca) pb 6249 ft	200	6336
DUVAL COUNTY—		
Armoil Prod. Co., Glover 1, sec 44 (Gov't Wells)	140	2350
Glover 2, sec 44 (Gov't Wells) ..	150	2347
Bridwell Oil Co., Sutherland 2, sec 122 (Hoffman) discovery oil well..	600	2718
Al. Buchanan & Blanco Oil Co., G. Ruiz 3, sec 73 (N. Loma Novio)	350	2693
Harvey & Henderson, Chernoskey 1, 330 ft sl and wl sec 266 (discovery well Seven Sisters), pb 2226 ft ...	73	2650
Magnolia, Bennett 1, 330 ft sl and wl sec 441	*	3716
M. Ruiz 9, sec 574 (Sarnosa) ..	50	2434
GONZALES COUNTY—		
Southwestern Dev. Synd., W. S. Atkinson 1, 2054 ft nl, 1034 ft el 185-ac tr, S. Y. Reims sur	*	5700
GUADALUPE COUNTY—		
L. E. Trout et al, Myrtle McKee 1, 1617 ft wl, 330 ft nl 239-ac tr, Green DeWitt sur	*	3297
HIDALGO COUNTY—		
Rogers O&G Co., F. B. Guerra 4, Tr 254, por 40 (Samfordyce)	150	2761
LAVACA COUNTY—		
L. A. Douglas, Fehrenkamp 1, 600 ft wl, 720 ft nl 202-ac tr, M. Mitchell sur	*	2851
McMULLEN COUNTY—		
Howeth & Swiger, W. H. Rhodes 1, 990 ft nl and wl sec 22, M. F. Lowe sur	*	3516
Loma Oil Co., L. Jacob Corp. 37-A, W. H. Jacob sur No. 8 (Jacob)..	50	975
REFUGIO COUNTY—		
Houston Oil Co., Pratt, Hewitt, Rcoke 22, T. Mullin sur, (Refugio)	525	4912
Pratt, Hewitt, Rooke 23, T. Mullin sur (Refugio)	550	4907
STARR COUNTY—		
Sunray Oil Co., Munoz 1, 23,358 ft nl, 330 ft el, por 75	*	4008
WILLIAMSON COUNTY—		
Ogden & Reed, Matteck 1, H. White sur (Byersville)	*	....
G. L. Rowsey, Tr., Sladek 4-B, H. White sur (Byersville)	70	885
Sladek 7-A, H. White sur (Byersville)	*	930
ZAPATA COUNTY—		
Texas Co., Measles 68, C. Blanco gr (Escobas)	*	1249

*Failures; †Junked; ¶Million cu. ft. gas.



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Saturated Oil Sand in Mykawa Well to Be Tested

Houston. — Sterling Oil & Refining Company's L. Wagenhauser 1, center of west half of Lot 10, F. F. Rothass survey, Mykawa field, Harris County, was preparing to test a sand which was reported saturated from 4462 to 4482 feet at the end of the week. The company topped the Discorbis from 4152 to 4170 feet, Heterostegina at 4350 feet, and failing to find any Marginulina, found the Frio at 4430 feet.

West Production Company has made location for B. J. Speck 1, 270 feet south of the north line and 400 feet east of the west line of 170-acre tract in the W. R. Wilson survey, Abstract 856, and is expected to start drilling operations as soon as equipment can be assembled.

Houston.—Turnbull & Irwin's Allison 1 was abandoned during the past week at 6050 feet, after running about normal with other wells drilled in the area. The test found the Marginulina from 5761 to 5791 feet. The wildcat is located in the H.&T.B. Survey, Section 79, center of Lot 36, in the Fresno area, Brazoria County.

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Gulf Encounters Oil Sand In Pierce Junction Test

Houston. — Gulf Production Company was setting strainer at 6250 feet in Taylor 1 at Pierce Junction, J. Hamilton survey, at the end of the past week, after encountering oil sand at 6244 feet. If this well is completed it will be the third producer in the Vicksburg formation along the southeast side of the field, and will cause several other wells to be drilled to this zone.

The same company has made location for Taylor 40, west offset to Hamil & Smith's Howe 1, which blew out some time ago and flowed through the drill stem. The test is located 89 feet south along the east line of the 560-acre tract in the southwest corner of Navarro Oil Company's H. C. Cain lease, and 56 feet at right angles, in the J. Hamilton survey. Derrick has been completed and drilling will be under way in a short time.

Montgomery County Well Has Showing in Cockfield

Houston.—Gas showing in Gholson et al's A. Parker 1, northwest of Willis, J. Lindley Survey, Montgomery County, has created some excitement last week and is being watched closely. On a drill stem test from 3670 to 3729 feet the operators had a showing of gas with 40 pounds pressure. The test showed one joint of mud, and no oil or salt water. One fourth and three eighths-inch chokes were used. The bottom of the hole is 3729 feet and the sand was topped at 3707 feet. The well is running 20 feet higher than the same operator's Crawford 1, which was drilled to the east, and which had showings of oil and gas in sands from 3816 to 3836 feet. The well was abandoned at 4483 feet. Parker 1 topped the Cockfield at 3695 feet.

Another Failure Recorded In San Felipe District

Houston.—Another failure was added to the San Felipe field during the past week when Buck Oil Company's Vaughn 1, 600 feet due west of the discovery well, Waller County, was abandoned at 3237 feet. The well tested only fresh water in the producing horizon for the field. The well is located in the J. McFarland Survey. The hole was plugged in the cap rock formation which was topped at 3220 feet. Buck Oil Company has made location for Vaughn 2, 300 feet south, thence 200 feet east from the discovery well in the J. McFarland Survey. The operators will skid the derrick from Vaughn 1 to Vaughn 2.

Dickinson Extension Test Misses Producing Sand

Houston.—Turnbull & Irwin's Piazza 1, has apparently missed the producing sand that was found in Humble Oil & Refining Company's Jones 1, Dickinson field, Galveston County. At the end of the week the company was coring below 8220 feet, after failing to encounter any showings of oil or gas. The producing horizon for Humble Oil & Refining Company's Jones 1, is around 8000 feet. Piazza 1, is located 250 feet south and 460 feet west of the producer in the J. Sellers survey.

Humble Oil & Refining Company has made location for Bayou Development Company 1, in the Dickinson field. The test is located 375 feet south of the north line and midway between the east and west line of Lot 7. The well is a south offset to the company's Danielson 1, which is the deepest producer in the Texas Gulf Coast. The same operator's E. E. Anderson 1, is located 375 feet north of the south line and mid way between the east and west line of Lot 4 in the J. Sellers survey. It is a north offset to Danielson 1.

Interest Increases in Genoa Extension Test

Houston.—One of the most interesting wells on the Texas Gulf Coast is West Production Company's O. P. Woodburn 1, in the Genoa area, A. Whitlock Survey, Harris County, which was drilling at 5805 feet at the close of the week. The well is running high on the Discorbis marker and is expected to find production soon. This test is a "mystery well" for the Texas Gulf Coast, with all information being withheld.

Johnson & Stanolind Oil & Gas Company's Fee Land 1, South Houston, Harris County, was waiting on cement to set after plugging back for the second time. The operators drilled to 5069 feet, and when the hole was found to be seven degrees off vertical, it was plugged back to 4920 feet. While drilling at 5000 feet in the sidetracked hole the operators went back into the old hole. The hole has now been plugged back to 4820 feet.

Houston.—Two new locations have been made in the Hastings field, Brazoria County, by Stanolind Oil & Gas Company. B. L. Turner 1 is located 695 feet north of the south line and 2550 feet east of the west line of A.C.H.&B. Survey No. 1. H. H. Moore 1 is located 330 feet north of the south line and 1725 feet east of the west line of A.C.H.&B. Survey No. 1. Both of the new tests have derricks erected.

The above picture shows a portion of the largest single order for Appleman Gumbo Bits ever placed.

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Wildcatting Increases in Madison County District

Houston.—Two new wildcat locations have been made in Madison County during the past week. Poteete et al's Poteete 1, is located 717 feet south of the north line and 690 feet east of the west line of the 716-acre tract in the Lewis Helsey survey. The well is located northeast of Madisonville.

Madisonville Production Company's D. C. Cannon 1, is located 660 feet north of the south line and 450 feet east of the west line of 185-acre tract, or approximately 1700 feet west of the east line and 4300 feet north of the south line of T. Phillips survey. It is three miles northwest of Madisonville.

Humble Completes Third Well in Anahuac Field

Houston.—The third producer was added to the Anahuac field of Chambers County during the past week when Humble Oil & Refining Company completed Broussard 1, 466 feet out of the northwest corner of H. & T. C. Survey, Section 63, in the Frio sands at 7125 feet. The well made 640 barrels per day through a quarter-inch choke, with 1670 pounds pressure on the tubing and 2590 pounds on the casing. The Frio was encountered at 7018 feet.

Humble Oil & Refining Company has made several new locations in the field and intends to develop the field at a steady pace. Clark 2, is located 232 feet west of the east line and 232 feet north of the south line in the H. & T. C. Survey, Section 57. Broussard 2, is located 232 feet east of the west line and 2332 feet south of the north line of H. & T. C. Survey, Section 63.

Two Liberty County Wells Are Waiting on Cement

Houston.—In the Hankamer field, Liberty County, Cretaceous Oil Company's Ezzell 3, 350 feet northwest of Ezzell 2, L. Barrow survey, was waiting on cement to set at 2555 feet. Seven-inch casing was set at that depth. The bottom of the hole is 2640 feet and the operators had a showing of oil at 2631 feet. Eljean Oil Company's Ezzell 1, L. Barrow Survey, was also waiting on cement to set at 2593 feet, after setting seven-inch casing at 2593 feet. Bottom of the hole is 2621 feet.

Humble Test Fishing After Salt Water Show

Lake Charles, La.—Humble Oil & Refining Company's Community 5, on the east flank of the Darrow dome, Section 33-10s-2e, Ascension Parish, is now down to 5186 feet and is fishing for a drill collar. The well tested salt water at 4744 feet.

Humble Oil & Refining Company's Gumble 1, which extended the field is making 500 barrels per day.

In Terrebonne Parish, Barnsdall Oil Company has closed a deal for the Minor estate south of the town of Houma for 21,000 acres. The deal calls for 120 days exploration option with a drilling obligation if the geophysical work is successful. Several of the major oil companies have been interested in this block for some time.

Houston.—There were 19 completions reported along the Texas Gulf Coast during the past week and of that amount 11 resulted in flowing and pumping wells with an initial production of 3441 barrels of oil per day. The remaining eight completions were reported as failures.

Texas Gulf Coast Completions

Company, Well and Location	Init Prod. Bbls.	Depth
ANAHUAC—		
Humble, Broussard 1	640	7125
BARBERS HILL—		
McAlbert Oil Co., Higgins B-3	460	4788
Sun, Chambers 3 (wo)	*	5538
CONROE—		
G. W. McCarty, J. T. Bertrand 1	594	5132
South Gulf Oil Co., Granger 1	41	5091
HANKAMER—		
Gulf, E. W. Boyt 18	100	2525
HIGH ISLAND—		
Yount-Lee, Lountela 1	*	4095
LIVINGSTON—		
Gem Oil Co., Watt 2	216	4256
MANVEL—		
Texas Co., H. J. Way 2	250	5154
ORCHARD—		
Gulf, Moore 42	80	2565
RACCOON BEND—		
Humble, Thompson 16	480	4133
SAN FELIPE—		
Buck Oil Co., Vaugh 1	*	3237
SOUR LAKE—		
Texas Co., Fee 319	90	1911
TOMBALL—		
Humble, Holderrith 2	490	5543
ANGELINA COUNTY—		
Pioneer Expl. Co., S. L. & B. L. Huffman 1, ne of Lufkin, S. Donegan sur	*	1207
BRAZORIA COUNTY—		
Turnbull & Irwin, Allison 1, Fresno Area, H&TB sur, sec 79	*	6050
GRIMES COUNTY—		
W. B. Roan et al's G. W. Sealy 1, sw of Kellum Springs, B. F. Smith sur	*	3278
MONTGOMERY COUNTY—		
W. C. Keeble's T. S. Foster 1, J. M. De La Garza sur	*	5230
POLK COUNTY—		
Humble, Tex. L. L. L. Co. 1, e of Goodrich, A. Viesca sur	*	4500

*Failures; †Junked; ¶Million cu. ft. gas.

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Gulf Coast's Deepest Producer Rated 980 Barrels Per Day

Lake Charles, La.—Another new oil field was added to the Louisiana Gulf Coast May 16, when The Texas Company's Bayou St. Denis 1*, six miles southeast of Lafitte, Section 19-17s-24e, Jefferson Parish, came in the rate of 980 barrels per day from Marginulina sands at 9572 feet.

Not only does this well open up a new field but it establishes a new producing record for the Gulf Coast, being 432 feet deeper than Humble Oil & Refining Company's Danielson 1, Dickinson field, Galveston County, Texas, which was completed at 9140 feet.

The new discovery well compares favorably in depth with record producers in other districts, and ranks as one of the three deepest producers in the world.

Another new honor goes to this discovery well as it is the first well to produce commercial oil in Jefferson Parish. A number of wildcats have been drilled in this area but all failed to uncover anything of commercial value.

Bayou St. Denis 1 was drilled to 9572 feet and 7⅝-inch casing cemented at 9558 feet with 300 sacks of cement. A ton and half of ice was used when cement was poured to lower the temperature.

Scouts report the casing was perforated from 9531 to 9556 feet with 30 holes and the well came in after swabbing five times. On the first hour gauge the well was making an estimated 1110 barrels per day of 34.9 gravity oil at 79°F. The oil showed one percent wash water but no salt water.

On the first 24-hour gauge the well made 2410 barrels of pipe line oil through a three-eighths inch choke with 1600 pounds on the tubing and no pressure on the casing.

This is another seismograph reflection discovery. The operators control approximately 6000 acres in a solid block. R. C. Stewart, division manager for The Texas Company is credited with handling the well and successfully bringing in the deepest producer on the Gulf Coast. The well was so carefully handled that the operators only encountered one fishing job which caused a short delay in drilling. Before the record string of 7⅝-inch casing was set the operators took great care with the derrick. It was braced to withstand the 130 tons of casing which was set. After setting the casing the derrick settled 26 inches. The test was spudded in on January 26, 1935. It is reported that the next well will be drilled to the south of the discovery well.

Surface geology was what first attracted independent operators which turned this block to The Texas Company. The well is located in the center of a red clay deposit which outcrops in that area.

There is some doubt as to the producing sand, but it is generally thought to be the Marginulina formation.

With Bosco, which was the forerunner to the present deeper drilling, Gillis, Roanoke and now the new Bayou St. Denis field, deeper production is more in evidence than ever before. Reports indicate that Bayou St. Denis will not hold the depth record long, as Roanoke has had a blowout at 9999½ feet. Operators of that well are drilling after plugging back on the latter deep test to the sands which caused the blow out.

*See Map page 81, The Oil Weekly, May 6, 1935.

Superior Prepared to Go to 15,000 Feet

Lake Charles, La.—Superior Oil Producing Company's Duplantier Community 1, University block, East Baton Rouge Parish, Louisiana, Section 65-7s-1w, is equipped with the largest and heaviest equipment in the world. The equipment is designed with special specifications. The operators have a 136-foot derrick with a rig for drilling to 15,000 feet. If the company finds it necessary to go to 15,000 feet it will move in a 176-foot derrick which will

Louisiana Gulf Coast Completions

Company, Well and Location	Init Prod. Bbls.	Depth
BOSCO—		
Superior, P. O. Hernandez 7.....	696	8792
LEESVILLE—		
Texas Co., L. L. E. Leesville 31..	1664	3677
LOCKPORT—		
Magnolia, Miller 14 (wo)	80	4379
VINTON—		
Vinton Pet. Corp., Grey 12	*	3960
TANIPAHOA PARISH—		
R. A. Conklin, Lake Superior Piling Co. 1, sec 19-5s-9e	*	4539

*Failures; †Junked; ¶Million cu. ft. gas.

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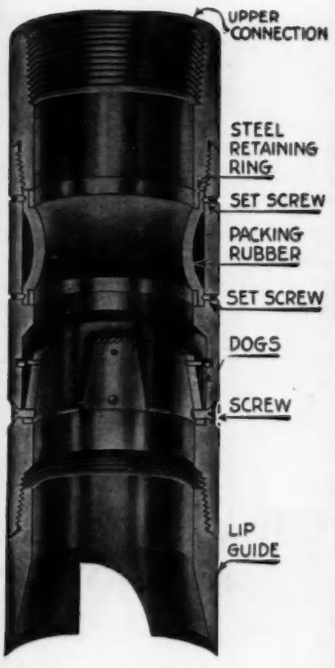

It is usually a simple matter, the minute pipe twists off, to run down and pick it up with a Gray Overshot, before it gets stuck . . . obviating expensive fishing jobs and often the loss of the entire investment in the well.

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GRAY TOOL COMPANY
Houston, Texas

be the largest derrick ever used on the Gulf Coast. At the end of the week the well was drilling in shale at 6634 feet. The operators have made a "mvstery" well out of this wildcat and will be interesting to watch both for development and engineering interest.

In St. Landry Parish, Milner & Eby turned its block of approximately 7000 acres to Gulf Refining Company at Sunset for $3500 for six months exploration work with a selection price.

Sun Oil Company has been active in this area and has taken considerable scattered acreage. Also Stanolind Oil & Gas Company and Humble Oil & Refining Company are interested in the play.

Lake Charles, La.—The Texas Company's State Lake Fausse Point 1, on the south flank of the dome, Section 35-11s-8e, Iberia Parish, was down to 4451 feet at the end of the week after coring sand showing oil from 3570 to 3585 feet.

In the New Iberia field, Iberia Parish, Hellis Oil Company's Bernard 3, which was completed a few weeks ago in the new sand for the field averaged 1750 barrels daily during the past week through quarter and three eighths-inch chokes.

South Louisiana Gets Most of Permits

Shreveport, La.—Twenty-one drilling permits were authorized last week by the minerals division, Louisiana Conservation Commission. Seven for North Louisiana were divided among the following parishes: Caddo, three; Caldwell, one; East Carroll, one; Morehouse, one, and Ouachita, one.

The fourteen in south Louisiana were divided among the following parishes: Calcasieu, one; Iberia, four; Jefferson Davis, two, and Terrebonne, seven.

Drill Stem Test Shows Distillate in Castle 1

Lake Charles, La.—In the Gillis field, Calcasieu Parish, Fohs Oil Company's Castle 5, 600 feet south of Castle 1, Section 13-9s-8w, made a drill stem test during the past week from 6926 to 6972 feet. The test was made in 10 minutes and showed one joint of distillate and 600 pounds pressure. The test was made through a quarter-inch choke on top and bottom. The operators are going to carry this well on down for a new sand.

The Texas Company's Nickerson Fee 2, Section 12-9s-8w, was waiting on cement to set at 6735 feet at the end of the week setting seven-inch casing at that depth. The oil sand was found from 6734 to 6748 feet. The bottom of the hole is 6753 feet. The Texas Company has made locations for Nickerson Fee 4, 5 and 6.

Union Sulphur Company made location for Powell Lumber Company 3, 2382 feet south and 290 feet east of the northwest corner of Section 12-9s-9w or 460 feet south and 380 feet east of State 1. The same operator's Mayo Reeves 3 is located 1604 feet south and 1041 feet east of the northwest corner of Section 12-9s-8w. Union Sulphur Company's State 7 is located 1316 feet north and 199 feet east of the southwest corner of Section 12-9s-8w. State 11 is located 2137 feet south and 1539 feet east of the northwest corner of Section 12-9s-8w.

Jennings Discussed

Houston, Texas.—Michel T. Halbouty and F. W. Mueller of Yount-Lee Oil Company, Beaumont, Texas, were the featured speakers May 16 at the regular weekly meeting of the Houston Geological Society.

They discussed the geology and geophysics of the southeast flank of the Jennings dome, Acadia Parish, Louisiana Gulf Coast, with special reference to overhang.

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DeSoto Parish Wildcat Preparing to Test

Shreveport, La.—E. B. Bird and associates of Beverly Hills, California, last week were running tubing in A. D. Johns, Jr. 1, SE NW 20-14n-16w, a wildcat in DeSoto Parish, preparatory to drilling in and testing. Six-inch casing was set recently at 2583 feet after a reported coring of oil sand in Tokio with bottom of hole at 2613 feet and after formation tester was run and showed six joints of oil in a half-minute before the seat collapsed.

Three miles southwest of the old Dixie field, Caddo Parish, A. F. Tarver's George 1, NE NE 23-19n-15w, which had shown four feet of sand said to have been saturated with oil, tested dry last week at total depth of 2424 feet. The well later was testing at 2462 feet.

Twentieth Gas Well Completed at Rhodessa

Shreveport, La.—The twentieth gas producer was completed last week in the Rhodessa gas field, Caddo Parish, Louisiana, and Cass County, Texas, when United Gas Public Service Company's Johnson Unit 1, SE NW NE 26-23n-16w, an east edge well, was completed at 5850 feet in the oolitic lime horizon of the Glen Rose gauging 73,500,000 cubic feet of gas with 2350 pounds rock pressure. The company is moving in rig for another Rhodessa test, three fourths of a mile northwest of production, D. F. Barr 1, Section 29-23n-16w.

One small gasser in the Ouachita River bed in the Monroe gas field, Ouachita Parish, and two small oil wells in the Converse field, Sabine Parish, completed North Louisiana's completions list last week. One of the Converse wells is flowing 200 barrels of oil daily after being treated with acid and the other is a 10-barrel pumper, also completed after acid treatment.

North Louisiana Completions

Company, Well and Location	Init Prod. Bbls.	Depth
—CADDO PARISH (Rodessa)—		
United Gas Pub. Serv. Co., Johnson Unit 1, sw ne 26-23n-16w	¶73½	5850
OUACHITA PARISH (Monroe)—		
Ferrell & Co., State of Louisiana 2, 31-20n-4e	¶2¼	2140
SABINE PARISH (Converse)—		
Lawson, Leavell & Bryant, Bank of Pleasant Hill 4, ne nw ne 29-9n-13w	10	1935
Windsor Oil Co., Bank of Pleasant Hill 2, ne ne 29-9n-13w	200	1708

*Failures; †Junked; ¶Million cu. ft. gas.

Five Thousand-Foot Test Planned for Winn Parish

Shreveport, La.—E. E. Parsons of Longview, Texas, and W. H. Rowe of Shreveport, have assembled a 7000-acre block of wildcat acreage in Winn Parish, north Louisiana, for a contemplated 5000-foot test. Location will be made in southwest quarter of Section 10-12n-2w, on what is known as the Sikes structure.

Ohio Oil Company several years ago drilled seven tests, including one junked hole, five miles northeast of this location, resulting in the discovery of a deep-seated salt dome. These tests were drilled in Sections 4 and 5-12n-1w.

In Z. R. Rolen 2, Account 1, Section 4-12n-1w, Ohio Oil Company logged top of volcanic ash at 4725 feet and top of rock salt at 4931 feet, the hole being abandoned in rock salt at 4953 feet. The same company's McCarty 1, Section 5-12n-1w, was drilled to 2642 feet and tested 100,000 cubic feet of gas with 540 pounds rock pressure at that depth.

Slightly north of a direct line between these tests and where Parsons and Rowe will drill, Standard Oil Company of Louisiana drilled Tremont Lumber Company 1, SE NW SW 1-

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12n-2w, to 4024 feet. The new test will be drilled on the theory of an east-west fault line. The location will be just south of three large deposits of paraffin earth and gas seeps which are in NWc 10-12n-1w, and NEc 9-12n-1w.

The block is eight miles northeast of Winnfield and 13 miles northeast of a marble quarry and salt mine.

Six miles north of the town of Calhoun, Crescent Drilling Company of Monroe is rigging Woolie 1, SE NW NE 34-19n-1e, Union Parish, for a 3000-foot test which may go to the anhydrite of the lower Cretaceous, probably around 4000 to 4500 feet. The test is on an 8000-acre block, which extends into Ouachita Parish. A test drilled a mile north of present location reported an oil show. A few major companies have taken protection acreage. This test is on the west flank of the Monroe Uplift in the North Louisiana Basin.

A. H. Richardson of Dallas, Texas, president of Monte Oil Company, has taken over Plain Dealing Corporation's 2500-acre block in Bossier Parish, four miles east of the shallow Hosston field, Caddo Parish, and plans an early test. A test drilled to 2880 feet several years ago in Section 15-22n-14w, is reported to be showing oil, sufficient it is believed to make a few barrels daily on the beam.

Another Test Planned In Arkansas Deep Hole

El Dorado, Ark.—H. L. Hunt, incorporated, last week planned to make another test of the Big Lime formation between 6400 and 6500 feet which had shown oil when E. F. Gregory 15, SE SE 10-17-14, a deep test in the Rainbow City field, was being originally drilled. The test was drilled to 6911 feet in rock salt after showing oil and salt water in a test at the 6500-foot level. Subsequently the test was plugged back to 4000 feet and a test of the Taylor sand at 3450 feet showed salt water.

Gulf Refining Company's Werner Lumber Company 49, Section 5-16-16, on the west side of the Smackover field, planned as an 8000-foot test, last week was drilling red shale and anhydrite at 5867 feet.

Arkansas Completions

Company, Well and Location	Init. Prod. Bbls.	Depth
UNION COUNTY (Rainbow City)—		
H. L. Hunt, Inc., J. D. Gregory 16, ne se sw 10-17-14	100	3390

*Failures; †Junked; ¶Million cu. ft. gas.

One Well Making 100 Barrels in Arkansas

El Dorado, Ark.—Only one completion was recorded in Arkansas last week this being H. L. Hunt, Incorporated's J. D. Gregory 16, NEc SE SW 10-17-14, completed at 3390 feet and making 100 barrels of oil and 700 barrels of salt water daily, being blown with air. The well is in the Taylor sand of the Rainbow City field.

Arkansas Permits

El Dorado, Ark.—Two drilling permits were issued last week by the Arkansas Board of Conservation. In Columbia County, The Gold Corporation of El Dorado will drill Wepfer 1, 330 feet north and east SWc SE NW 24-15-20. In Sevier County, Pendleton & Vaughan of De Queen, Arkansas, will drill Pendleton & Vaughan 1, 1160 feet south and 360 feet east NWc NE 35-9-30.

El Dorado, Ark.—Two new locations were announced last week in Arkansas, both of them wildcat tests. In Arkansas County, near a former test recently abandoned after several reported shows of oil and gas, Grand Prairie Realty Company has rigged Fischer 2, NE NW NW 6-6s-4w. In the northeast part of Ouachita County, Snow-Black Petroleum Company which recently assembled a large block, is rigging for O. F. Wyman 1, in north half SW 36-11-16.

Arkansas Operators Plan Drilling in Alabama

Mobile, Ala.—Mrs. Mamie McCurry of El Dorado, Arkansas, and associates, who have a 40,000-acre block in Baldwin County, Alabama, have made tentative location for their proposed 5000-foot test on Southern Kraft Company land in Section 28-2s-4e, near the town of Bay Minette. Joe Modisett of El Dorado has the drilling contract. Three major companies are reported to have taken spreads in the block, United Gas Public Service Company having 3000 acres; Sun Oil Company, 1500 acres, and Arkansas Natural Gas Corporation, having 500 acres.

Jackson, Miss.—Frozen drill pipe caused junking and abandoning of the second of a series of four core hole tests being drilled in Lamar County, south Mississippi, by Sun Oil Company. The abandoned hole is in SE NE SE 30-4n-15w. The present series is the second to be drilled on this large block.

Monument Development Plan Calls for 75 Wells This Year

Hobbs, New Mexico.—Development program for the Monument field, a potential major oil producing area for Lea County, calls for a maximum of 75 wells during the current year. Owners of leases in the probable producing area, as outlined by geophysical data, have agreed to restrict drilling to the above number of wells for the first year, with the majority favoring the spacing of wells at the center of 40-acre units. However, provisions are made for those insisting on the drilling of one well to 10-acre spacing in the plan now being signed by the various property owners for submission to the Oil Code Administration for approval. Individual well production restrictions are to be on the same basis as that enforced by the state in other Lea County fields, except the Hobbs field.

The Monument field has a second oil producer in process of completion; another drilling below 1000 feet and locations made for three others. Amerada Petroleum Corporation's State 1-F, C SW SW 36-19s-36e, a north offset to the company's discovery well, is awaiting results of treatment of the oil saturated lime encountered between 3805 and 3903 feet with 2000 gallons of acid after showing for a 500-barrel producer. Seven-inch casing was cemented at 3798 feet, and 2½-inch tubing lowered to 3893 feet. The well has an elevation of 3594 feet, and was drilled to 309 feet sub sea. The discovery well was completed at a sub-sea depth of 355 feet after plugging back from 3954 to 3945 feet because of making a small percentage of sulphur water from the bottom of the hole. The company is seeking to determine the production value of the upper portion of the lime, then will deepen to the main producing zone found by the first well, using oil for circulation.

An initial flow of 150 barrels of 32½ gravity oil per hour was recorded by Amerada Petroleum Corporation's State 1-D, the Monument area discovery well, when given 17-hour gauge through open three-inch tubing on March 16 after treating lime with 2000 gallons of acid. Other than providing fuel for the drilling tests in the area, it has remained shut in for pipe line connections. The Texas Pipe Line Company completed a six-inch line extension from its pump station in the Eunice field, a distance of about 10 miles, and began emptying lease stock tanks of crude held at the Monument well on the night of May 14.

Repollo Oil Company and Anderson-Prichard Oil Corporation's B. W. Ar-

Mountain States Completions

NEW MEXICO

Company, Well and Location	Init. Prod. Bbls.	Depth
LEA COUNTY (Cooper Field)—		
Texas Co., I. B. Ogg 2-B, c se ne 34-24s-36e	2500	3501
LEA COUNTY (Hobbs Field)—		
Continental, W. D. Grimes 3, swc nw se 28-18s-38e	11,100	4225
SAN JUAN COUNTY—		
Continental Oil Co., Rattlesnake 43, nw se nw 12-39n-19w	*	990

MONTANA

GLACIER COUNTY (Cut Bank Field)—		
Par Oil Co., Haines 4, se se 2-34n-6w	150	2867
TOOLE COUNTY—		
Texas Company, Swears 5, csw 9-35-2w	90	1555

*Failures; †Junked; ¶Million cu. ft. gas.

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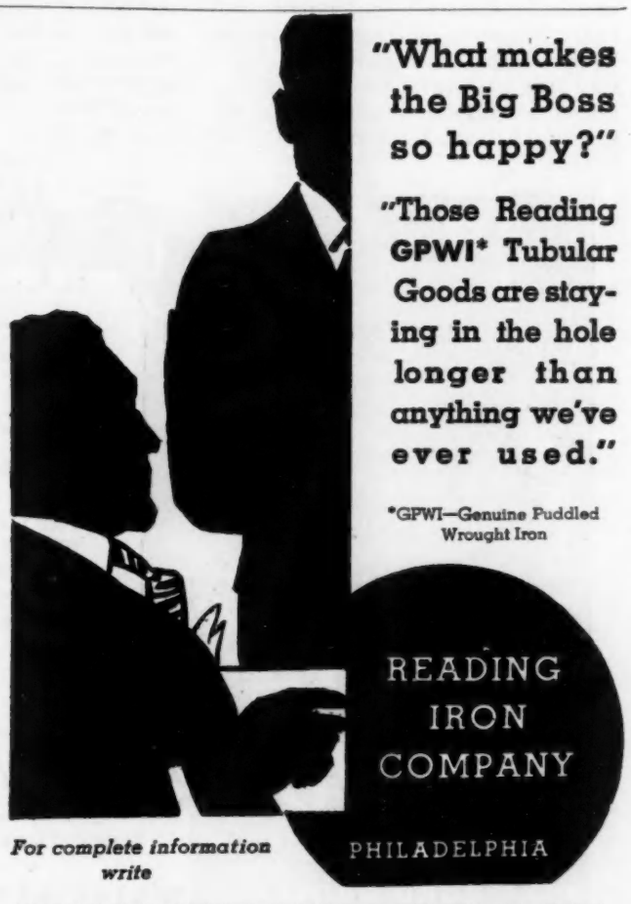

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nold 1, SWc NW SE 11-20s-38e, a wildcat five miles south of the Hobbs field, failed to respond to treatment with 3000 gallons of acid in lime at 4628 feet, or 1061 feet below sea level, and has deepened to 4720 feet. Oil saturated lime was logged at 4225-30 feet and 4255-65 feet, with best oil showings at 4295-4305 feet, with an elevation of 3567 feet. A small amount of oil showed with mud on several drill stem tests made before injection of the acid.

Potential flow of 11,100 barrels of oil and 3,500,000 feet of gas was earned by Continental Oil Company's W. D. Grimes 3, SWc NW SE 28-18s-38e, situated near the east flank of the Hobbs field after treating lime at 4105-4225 feet with 4000 gallons of acid solution.

Rated as one of the most interesting wildcats in Lea County, Ohio Oil Company's State-McDonald 3, C NW SE 16-22s-36e, situated about 2¾ miles southeast of nearest oil production in the Eunice field, logged top of brown lime at 3060 feet, of 502 feet above sea level. It is about 100 feet lower on structure than the company's State-McDonald 1, located less than one mile to the east. The latter proved capable of making a small oil producer in 3800-foot lime when drilled in 1930, but encountered water in deepening to 3904 feet. Efforts to plug back to the oil horizon were unsuccessful. The well was completed as a gasser by ripping casing at 3530-3630 feet. Ohio Oil Company's State-McDonald 2, C NW SW 14-22s-36e, situated less than one mile to the east of the original well, was completed last October as a big gasser at 3440-3850 feet after drilling to 4350 feet. Top of brown lime was logged by the latter at 3090 feet, or 422 feet above sea level, and first white lime at 498 feet below sea level.

Wild Cooper Gas Well Is Controlled by Relief Test

Hobbs, New Mexico.—New Mexico's most difficult wild gasser has been placed under control after an elapse of about seven months, and the path is clear for it to be completed as a commercial producer. Humble Oil & Refining Company, Kirby Petroleum Company and Edson Petroleum Company's J. L. Coates 1, C NW NE 10-24s-36e, 1½ miles north of nearest oil production in the Cooper area, blew out and damaged casing early last October in the prolific gas zone at 3370 feet. Gas craters formed around the well site and burned for three days, but the well and equipment were spared. The presence of carbon dioxide, or "dry ice" gas, with the petroleum gas aggravated the situation. The original hole was considered hopelessly junked, but could not be plugged in accordance with state regulations, when a relief well, spotted 400 feet to the west, was started on February 8. The relief well was drilled to 3394 feet, and pumped 200 to 300 barrels of water per hour into the hard lime formation under 600 pounds pressure. The returns were slow in appearing with the gas flow from the junked well, requiring several weeks to diminish the flow so as to permit the removal of lost drill pipe. The original well has been cleared of junk, and a string of 5 3/16-inch pipe cemented.

Humble Oil & Refining Company et al's Coates 1 logged top of brown lime at 2995 feet, or 388 feet above sea level, indicating a favorable structural position for the completion of an oil producer. Plans are to deepen the relief well to the 3500-foot oil horizon and complete as a producer after the original test is completed.

A maximum quota of 50 new wells for 1935 has been fixed by the Oil Code Administrator for the Cooper field, including the 24 wells added since the first of the year. Drilling has been temporarily halted on unnecessary locations in the main section of the field because of water intrusion, but successful completion of the two tests on the north end by Humble el al will result in the starting of a large number of new operations.

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Wyoming Proven Fields Activity on Increase

Casper, Wyo.—Seven new locations were released in Wyoming proved fields this week as the northern Rocky Mountain drilling season started into action. This brings the total of proved field drilling wells to 18.

Ohio Oil Company is moving in material for Byron-Union 3, NW NE 22-56n-27w, in the Byron field. The company has two other wells drilling at Byron, Robert Till 1, C SE SW 24-56n-97w, spudding, and Sidon Canal 2, southwest corner Lot 40, Section 24-56n-97w, drilling at 2335 feet. In order to more adequately take care of its drilling campaign in the Byron district, Ohio Oil Company is moving its machine shop from the Grass Creek field to Byron and adding additional equipment.

In the Hamilton Dome field, Hot Springs County, Argo Oil Company of Denver is rigging for Ellen 16, NE SE Section 14-44n-98w, a first report.

In western Wyoming, Mountain Fuel Supply Company released location for

Joseph Brooks 1, C NW NE 16-66n-104w, in the South Baxter Basin field, Sweetwater County and The Texas Company is drilling at 595 feet in Calpet 4-K, SE SW Section 34-27n-113w, in the LaBarge field.

In the Hidden Dome field, Washakie County, C. L. Brome's Government 3, SW NW NW 31-48n-90w, is spudding.

Wyoming Test Indicates Record Light Oil Strike

Medicine Bow, Wyo.—Flowing a clear, golden crude oil that tests 63 gravity, approximately gasoline, Ohio Oil Company and The California Company's joint wildcat well on Big Medicine Bow Dome, eight miles southwest of here, gauged at the rate of nearly 4000 barrels daily on a drill stem test.

This is the largest development of such a high gravity crude in the history of petroleum. The Turner Valley field, Alberta, Canada, is the only high gravity crude development that approaches the Medicine Bow strike. In that field, the naphtha wells, testing around 72 gravity, range in production from 10 to 600 barrels daily.

The oil strike on Medicine Bow is the largest and most significant wildcat development in the Rocky Mountain States, since the discovery of oil at Salt Creek in 1914. The Big Medicine Bow structure embraces 7000 acres within its lowest closing contour, and has a closure of 2700 feet. It is the third largest structure in the state, with Salt Creek of 28,400 acres, and Oregon Basin of 9400 acres heading the list.

The well, Wm. Kyle 1, NE SE NE 26-31n-79w, Carbon County, developed the crude in the second bench of the Sundance sand. Open for four hours with the formation tester seated at 5299-5361 feet the well produced 165 barrels an hour through the drill stem. It is expected that the well will make between 4000 and 5000 barrels daily when it has cleaned and completed.

The joint operating companies are preparing to run the five-inch production string to the top of the second bench of the Sundance sand, and will produce gas from the first bench of the Sundance through the seven-inch string which is set in the top of the sand at 5159 feet, and will be bradenheaded to the five-inch casing. The well developed 36,000,000 cubic feet in the first Sundance three weeks ago on a drill stem test between 5151-5222 feet.

The 14½-inch surface casing is cemented at 391 feet, and the well drilled 4768 feet of open hole without mechanical delay. The Rocky Mountain Drilling Company, headed by Dorsey Straitiff, is drilling the well under contract.

Big Medicine Bow Dome is six miles due south of Allen, Wyoming, railhead on the Union Pacific, transcontinental road, and there is considerable speculation as to whether The California Company (Rocky Mountain operating subsidiary of the Standard Oil Company of California) will build a refinery in Wyoming. The company recently brought in a wildcat well on the Quealy Dome structure in Albany County, 35 miles southwest of Medicine Bow. Rawlins, Medicine Bow, and Laramie have been named as possible refinery locations. The California Company's wildcat on Quealy came in for 600 barrels daily.

The California Company and Ohio Oil Company jointly hold the 7000 acres embracing Big Medicine Bow Dome. The new field is five miles west of Ohio Oil Company's gas line from the Allen Lake field north of Medicine Bow.

Big Medicine Bow has long been regarded as one of the most favorable structures in Wyoming for the accumulation of oil and gas.

Several years ago Southwestern Petroleum Company and Cliff Petroleum Company drilled a joint well in NW SW 25-21n-79w, on Big Medicine, and developed a 900-barrel flow of oil in the Muddy sand.

Kyle 1 was located after company geologist made a detailed study of sub-surface structure through a seismograph survey. The well is located on a government permit held by William Kyle of Medicine Bow, Wyoming.

Iles Dome Well Increases Flow After Deepening

Craig, Colo.—Recompletion of Stanolind Oil & Gas Company's Shaw 4 S-D, NE NW NE 27-4n-92w, in the Iles Dome field, Moffat County, northwestern Colorado, resulted in a production boost of from 80 to 1848 barrels daily. The well completed in 1928 for 300 barrels initial at 3426 feet in the top of the Sundance sand. The company went back into the well four weeks ago after production had dropped and it began making water believed to be coming from the Morrison formation, pulled liner and drilled deeper to present total depth of 3464 feet in the Sundance, where better production developed. The company's Shaw S-D 16, SE NW NW 27-4n-92w, is rigging rotary for a test to the Sundance.

New Playa del Rey Well Making Only 1200 Barrels

Los Angeles.—Dunlap Oil Company's No. 2 in the Playa del Rey extension of the old Venice field started flowing by heads night of May 12 at the rate of 1200 barrels a day and was to be placed on the compressor. Total depth is 6785 feet with 6⅝-inch cemented at 6470 feet, and with 4¾-inch liner landed close to bottom. The well did not show the pep expected but may improve when placed on the compressor.

Union Oil Company's Vidor 9 stopped drilling at 6310 feet in schist, the top of which was reached at 6308 feet. The oil sand was topped at 6161 feet and 6⅝-inch was cemented at 6030 feet. The company is drilling two other tests on the Vidor lease and one of them is drilling below 5100 feet. No. 11 is ready to spud. Twenty other wells are drilling in the extension and five other wells are almost ready to start drilling.

To some extent this new extension is still an unknown quantity and limits of the field are unknown. But no townlot drilling is expected and there will be no market threat, nor any hot oil to cause any apprehension since no tank trucks can move under a city of Los Angeles ordinance.

New Montebello Well Making 30 Barrels Hour

Los Angeles.—Universal Consolidated Oil Company's eastern edge test at Montebello was swabbed back on production May 12 after recementing 8⅝-inch casing at 5425 feet, and the well is flowing by heads at the rate of 30 barrels an hour of oil and a small amount of emulsion. The flow is through one ¾-inch choke with 250 pounds pressure on the casing and a varying pressure of 40 to 100 pounds on the tubing.

Wilshire Oil Company is building rig for Ahfeldt 1 on a nearby lease, and Woodworth Oil Company is rigging up to start drilling Lapworth 1. The Texas Company's Whittier 1 cemented 18⅝-inch casing at 849 feet and will drill ahead. The Texas Company's location is close to the new producer.

No new lease deals have been reported since practically all of the available land in the new area already is taken by companies planning to drill.

The showing of the latest producer when recompleted was a disappointment.

Santa Fe Springs

Los Angeles.—Union Oil Company is the only active concern in the old Santa Fe Springs field and has five strings of tools going. The company is preparing to start drilling at three other locations and two new locations have been made.

Kettleman Hills Well Produces 7435 Barrels

Los Angeles.—Standard Oil Company's No. 21-29J, North Dome of Kettleman Hills, Section 29-21-17, was completed May 5 for 7435 barrels of 35 gravity oil and 7,880,000 cubic feet of gas at 8695 feet, with 9⅝-inch casing cemented at 7660 feet. Seven-inch liner was landed at 8690 feet and perforated at three points. The well is flowing through 4½-inch tubing hung at 7615 feet.

Three other holes are nearing the completion stage and 18 wells in the field are below 7000 feet. Kettleman North Dome Association is preparing to start six new holes and Standard Oil Company will start three new ones in the next three weeks.

The lone well in the Middle Dome is drilling at 6105 feet in hard brown shale.

Certain Pacific Western Properties Are Purchased

Los Angeles.—Purchase of certain properties formerly belonging to the Pacific Western Oil Company was consummated May 7 by the Shell Oil Company and the Kettleman and Inglewood Corporation; the latter being a company jointly owned by the Standard Oil Company of California and Honolulu Oil Corporation, Ltd.

The properties purchased consist of all of the acreage in the North Dome of Kettleman Hills, formerly held by the Pacific Western Oil Company, being an undivided one half interest in 1760 acres which includes 1600 acres of government leases. This one half interest represents at present some 7.5 percent of the Kettleman North Dome Association's holdings which are considered productive. Other parcels transferred include three leases in the center of the Inglewood oil field in Los Angeles County.

The Inglewood properties will be operated for the joint account by Standard Oil Company of California acting for the Kettleman and Inglewood Corporation. The major part of the consideration for these producing lands in the Kettleman North Dome and Inglewood consisted of the assumption by the purchasers of the $10,000,000 outstanding notes of the Pacific Western Oil Company. All of these notes have been called for redemption as of June 10, 1935.

California Completions

Company, Well and Location	Init. Prod. Bbls.	Depth
KETTLEMAN HILLS—		
Standard No. 21-29J	7435	8695
BUENA VISTA HILLS—		
Honolulu Oil Corp. No. 35	850	3229
KERN FRONT—		
Kern River Oilfields, No. 2	430	2165
MOUNTAIN VIEW—		
Barnsdall, Morris 3	3740	5740
MOUNT POSO—		
Shell, Vedder 23	1100	1916
VENTURA AVENUE—		
Associated, Lloyd 134	1100	9378
LONG BEACH—		
Bunker Hill Oil Co., No. 1	700	4215
Caro-Lyne Oil Co. No. 1	150	4535
C. H. B. Oil Co., No. 1	185	3950
INGLEWOOD—		
Associated, Vickers 60	235	3675
DOMINGUEZ—		
Union, Hellman 34	610	4830
MOUNTAIN VIEW—		
Ohio Oil Co., Derby 1	*	5999
KERN RIVER—		
Hugh B. Evans, No. 7	*	2390
ROUND MOUNTAIN—		
Honolulu Oil Corp., No. 63	*	2016
VEDDER—		
Signal O&G Co., Siemon 1	*	1464
PYRAMID HILLS—		
General, Martin 1	*	2077

*Failures; †Junked; ¶Million cu. ft. gas.

Shell to Drill Many Wells at Dominguez

Los Angeles.—Shell Oil Company is fast preparing to push its drilling campaign at Dominguez in Los Angeles County and at last report had made locations for 10 tests to be drilled on the Reyes lease. Only three are being drilled at this time, but two of them should be completed by June 1. Reyes 75 is due to start in a few days.

Union Oil Company is drilling four wells in this field, all due for completion within 30 days, but three new holes will be drilling within two weeks.

Only the two companies mentioned are active in this field.

West Coast Companies See Need of New Oil

Los Angeles.—There is a growing feeling on the part of the major companies in California that there will be a scarcity of crude oil in the state in the next few years. In fact, the question is now being asked "where will the crude oil come from in California in 1940?"

New locations are being made in the older fields of the state by the larger companies to draw from oil sands held in reserve for several years. Shell Oil Company is to drill from 20 to 35 new wells at Dominguez to secure new production. A number of these will be twin wells, to tap the lower zone long held in reserve. Union Oil Company also will drill new wells in this field. No other company has any acreage at Dominguez worth drilling.

Kettleman Hills is the big question mark in California. The pressure is going off comparatively fast and intermediate water is encroaching. It is now an open secret that companies holding acreage at Kettleman Hills have reached the conclusion they must increase drilling operations in that field if they wish to hold up their production during the coming five years. This field is no longer a threat.

Practically every old field in the state is the scene of new drilling. Most of the wildcatting in the state is in the San Joaquin Valley, but recently new interest is being taken in Southern California in areas tested in past years, but where the holes were abandoned at less than 5000 feet. Several Los Angeles fields are becoming active with new holes going down and old ones being worked over.

Long Beach continues to be the most active field in the state with new completions ranging from 75 to 300 barrels at depths averaging close to 4000 feet. Old wells at Long Beach are constantly being worked over to increase production. Long Beach is still the playground of the smaller operators.

No field in California today is considered a threat. Mountain View and Edison in Kern County are very much in the small field class. The older fields in San Joaquin Valley can do no more than hold their own. The deep sand at Belridge will furnish some production over a period, but the field by no means can be counted upon to furnish really big production.

The Playa del Rey extension of the old Venice field in Los Angeles County will furnish considerable production, but drilling restrictions are such that forbids drilling on very small tracts, and since no storage facilities are permitted under city ordinance, the activity will be held within reasonable bounds.

There is no scarcity of oil today, and will not be for another two or three years, but within four to five years the outlook is different.

Hopper Canyon Area Is Getting Some Attention

Los Angeles.—The completion of 150 to 175 barrel wells making 36 gravity oil at a comparatively shallow depth is bringing the Hopper Canyon area in Ventura County to the front and during the coming few months it is expected several new wells will be completed.

Oil Ridge Oil Company recently completed Moran 3 for 150 barrels of 36 gravity oil at 1603 feet. This hole was drilled with cable tools and was started November 26, 1933, on a 900-acre tract.

Less than two miles west of the new Moran producer, Topa Topa Oil Com-

pany completed a 175-barrel well several months ago at 3200 feet.

The Hopper Canyon area is located on what is termed the Topa Topa anticline, and the production is coming from the Modelo formation. Bolsa Chica Oil Corporation is drilling a test about two miles east of the Moran producer, and has reached 2550 feet, using rotary tools.

Other concerns holding acreage in the Hopper Canyon area include Union Oil Company, The Texas Company, Bolsa Chica Oil Corporation, Hancock Oil Company, Bardeen Oil Company and others.

Fresno County Test For Gas Looks Bad

Los Angeles.—Milham Exploration Company's test for gas near Dos Palos in Fresno County, Oro Loma 1, has reached a depth of 4800 feet and has reported no showings. A test at 4800 feet showed only salt water. It is understood the company plans to drill to 5000 feet, and if nothing is found by that time, will quit. The test has been drilling in the Cretaceous formation for several hundred feet.

Mt. Pleasant, Mich.—Pure Transportation Company May 14 started construction of a six-mile four-inch welded pipe line from the Crystal district in Montcalm County to a loading rack on the Grand Trunk Railroad at Carson City.

David E. Beach, general superintendent, said with the new line completed the company will have a daily capacity in the district of 47,000 barrels a day. The company is operating a six-inch line to Vestaburg, eight miles.

Michigan Completions

Company, Well and Location	Init Prod. Bbls.	Depth
MIDLAND COUNTY—		
Pure Oil Co.'s Hoyt A4, 13n-1w, sw se se-17	110	3425
St. Louis Pipe & Supply Co.'s Hoyt 1, 13n-1w, sec 19	*	3450
ISABELLA COUNTY—		
Morris Oil Co.'s Marthey 1, 15n-3w, nw ne se-19	30	3654
Chippewa Oil Co.'s Diehl 1, 14n-6w, ne se-15	*	1400
Michigan Cities' Leinarr 1, 14n-6w, se nw-11	¶	1350
W. J. Bernier's Gatehouse 1, 14n-6w, ne ne-2	*	1390
OGEMAW COUNTY—		
Allen Park's De Coster 1, 22n-2e, ne nw sw-19	30	2760
Gordon Oil Co.'s Lally Bros. 1, 22n-2e, ne nw sw-19	30	2600
MECOSTA COUNTY—		
Columbia Oil Co.'s Freeman 1, 13n-8w, sw sw-24	¶7¾	1340
GLADWIN COUNTY—		
M. F. Whitehill's Spicer 1, 17n-2w-sw nw-11	*	4020

*Failures; †Junked; ¶Million cu. ft. gas.

Gladwin County Failure Halts Contemplated Work

Mt. Pleasant, Mich.—M. F. Whitehill's Spicer 1, 17n-2w-11, Gladwin County, south offset to the Whitehill-Kintner discovery deep well in Gladwin County, drilled into black water 142 feet in the Dundee lime and will be abandoned. Failure of the offset test probably will result in canceling or delaying contemplated tests in the district.

Sun Oil Company's Hines 1, 17n-1w-31, four miles southeast of the discovery well in Gladwin, reported oil shows 90 feet in Dundee lime and 900 feet of fluid in the hole 130-140 feet in but picked up black water at 3998 feet. Operators plan to plug back and acidize.

Completion in Dundee lime next week is expected on two or more tests in the Montcalm district, now the center of Michigan operations with 30 active rigs and 41 other locations. Taggart Brother's Smith 1, 10n-5w-1, a half-mile east of the Leonard-Durbin discovery well, is standardizing at 2810 feet, Traverse lime 2757 feet, while Eastern Gulf is drilling below 2800 feet in lime on Barger 1, 10n-5w-2, direct north offset to the discovery.

The Taggart Smith test was the first attempted Dundee test in the state with rotary. Operators plan to move the rotary to Smith 2, and believe that with information on structural conditions now at hand that the rotary will successfully complete to the Dundee lime, approximately 3200 feet. Stringers in the shale break between the Red Rock and Traverse gave the greatest trouble.

Eastern States Completions

SOUTHEASTERN OHIO

Company, Well and Location	Init. Prod. Bbls.	Depth
MONROE COUNTY—		
A. L. Lucas & Co., John L. McCurdy 2	¶	1585
Wm. Anderson & Co., John Hoge 2	2	1936
Forrest Simmons, Chas. W. Hall 2	*	1530
Roy B. Decker & Co., J. L. & H. C. Gillespie 4	*	1672
WASHINGTON COUNTY—		
Harry Brinegar, L. C. Moore 6	*	1967
Local Oil Co., Pear Cane 1	5	414
W. L. Swingle, A. V. Bogard 1	3	414
Turney & Co., Myron Leasure 25	5	541
D. T. Orndoff, Phil Roe, Jr. 3	*	1470
Ridgeway & Patterson, Jacob Boltz 2	5	1274
NOBLE COUNTY—		
D. & C. Rich, C. M. Hutchinson 3.	¶	1342

CENTRAL OHIO

GUERNSEY COUNTY—		
George Jewell & Co., J. A. & I. L. Warehime 1	¶	1326
Frank Lyons & Co., Z. Rich 1	¶	1286
Ferguson & McCullough, Homer Winnett 1	*	1311
W. Salladay & Co., Paul Miche 7	¶	1397
Mike Hardwick, F. W. Gray 2	¶	592
George Jewell & Co., A. F. & Etta Henderson 1	¶	1360
Anna F. Rose, Morgan & Walters 1	*	1502
Frame Bros., J. W. Tipton 8	*	....
MEIGS COUNTY—		
I. Fleming, Irvin Fleming 1	¶	....
Joe Rubin & Co., Elias Jurden 5	¶	1980
Elias Jurden 6	¶	2000
BELMONT COUNTY—		
Barnesville Development Co., M. C. Thornbury 2	*	1748
TUSCARAWAS COUNTY—		
James Upham, Alfred C. Uhlers 1	30	4832
LORAIN COUNTY—		
R. E. Gain, Isabel Gain 1	¶	1015
HOLMES COUNTY—		
Lloyd S. Finley, Loyd S. Finley 1	*	888
KNOX COUNTY—		
Upham Gas Co., M. L. Young 1	¶	2930
FAIRFIELD COUNTY—		
City Natural Gas Works, Dan Stiger 1	¶	2040
COSHOCTON COUNTY—		
Preston Oil Co., Wm. Frazee 1	46	3145
E. J. Edman, Chas. McCoy 1	¶	890
ATHENS COUNTY—		
Gross & Frebault, A. C. Verity 2	¶	560
MUSKINGUM COUNTY—		
C. O. Moore, Lenitelley 2	¶	718

NORTHWESTERN OHIO

Company, Well and Location	Init. Prod. Bbls.	Depth
SENECA COUNTY—		
Industrial Gas Co., Frank Sherger 2	¶	1374

KENTUCKY

HANCOCK COUNTY—		
Joseph B. Mathers, J. W. Matthews 14	160	....
OHIO COUNTY—		
Snowden-McSweeney Co., H. J. O'Dell 13	¶	....
H. J. O'Dell 14	110	....
Kate Roberts 6	115	....
W. E. Hupp & Co., J. W. O'Dell 31	25	....
J. W. O'Dell 30	¶	....
The Petroleum Co., Bellamy Hrs. 2	15	....
Stewart Gealy, J. H. Roberts 11	75	....
Cumberland Petroleum Co., Sid Lancaster 16	*	....
Inland Oil & Gas Co., C. R. Rhodes 1	10	....

INDIANA

DAVIESS COUNTY—		
Mid-West Dev. Corp., Ira J. Gilley 1	¶	....
George W. Friendly 2	*	678
KNOX COUNTY—		
Gardner Petroleum Co., Effie Taylor 1	¶	....
Burton Bland 1	¶	....
M. E. Blann, C. E. Beard 1	¶	....
National Consumers Co., B. H. Yates 1	50	....
PIKE COUNTY—		
Claud Noble, Edward Adams 3	¶	....
Midwest Development Corp., William Pile & Co. 1	*	1612
GIBSON COUNTY—		
Claud Noble, Edward Adams 3	¶	....
PIKE COUNTY—		
Indiana Southwestern Gas Corp., G. W. Decker 1	*	....
WABASH COUNTY—		
Warren K. Shoemacher, H. W. Williams 1	*	....
JAY COUNTY—		
Amber Oil Producing Co., F. E. Davis 17	*	....
PERRY COUNTY—		
Rome Oil Co., Henry Dutchke 1	*	1230
HARRISON COUNTY—		
James H. Kraft, Sid Elbert 1	*	....
VANDERBURG COUNTY—		
J. S. Young, Jr., Frank E. Keck 1	*	....

*Failures; †Junked; ¶Million cu. ft. gas.

Drilling Reports on Important Wildcats

KANSAS

BARBER COUNTY — Wentz' Skinner 1, cnw ne 29-31s-14w, dr 1550 ft.

BARTON COUNTY—Lario O&G Co. et al's Nuss 1, nw sw sw 11-16s-14w, run 8-in csg 2335 ft. Wolf Creek's Kraft 1, sw sw sw 26-16s-11w, sw 3400-3402 ft. Suppes & Witts' Hayes 1, sw sw sw 6-16s-14w, dr 340 ft. McMorrow & Spencer's Hagen 1, ne ne ne 33-20s-11w, sd 3950 ft. Pryor & Lockhart's Herrington 1, ne ne nw 6-16s-12w, spd. Derby Oil Co. et al's State 1, ne se se 4-20s-11w, testing. Lario O&G Co. & McCoy's Dolechek 1, ne nw ne 13-16s-12w, ru.

BUTLER COUNTY—Emrich et al's Heorman 1, sw sw sw 20-26s-3e, spd. Ward McGinnes' Jackson 1, sw sw ne 26-25s-8e, dr 600 ft. Sanford et al's Cron 1, se se se 1-28s-4e, dr 2084 ft. Hay & Cameron's Johnson 1, nw nw se 16-26s-6e, dr 475 ft. Western Kansas O&R Co.'s King & Marshall 1, nw nw sw 11-28s-6e, rig.

COWLEY COUNTY — McCoy's Brandenburg 1, sw sw se 17-34s-5e, dr 2950 ft. Lloyd, Frost & Study's Weathered 1, sw se se 28-31s-3e, hfw 2495 ft, dr 2605 ft. Baden, Johnson, Roth & Farrout's David 1, ne ne sw 35-30s-4e, rig.

ELLIS COUNTY—Palmer & Storm King Oil Co.'s Ruder 1, se ne nw 17-15s-18w, rig. Stanolind's Penny-Wann 1, nw sw se 12-15s-20w, br.

ELLSWORTH COUNTY—Lario O&G Co. et al's Central National Bank 1, se se nw 33-15s-8w, spd and sd; State 1, sw sw sw 29-15s-8w, dr 3001 ft. Western Exploration Co.'s Wilkins 1, nw sw nw 9-17s-9w, spd.

GREENWOOD COUNTY—Mullendore et al's Pedroje 1, ne ne sw 14-23s-11e, dr 1817 ft.

HARVEY COUNTY—Twin Drilling Co. et al's Ruth 1, sw sw sw 16-22s-2w, dr 2750 ft. Goering Brothers et al's Brainard 1, ne ne sw 3-23s-2w, dr 1920 ft. Cameron, Derby & Trees' Brainard 1, sw se nw 17-24s-2e, dr 2420 ft. Winkler-Koch et al's Mueller 1, se sw nw 15-23s-2w, spd and sd. Lauck et al's Baller 1, sw sw sw 29-24s-1e, fsg 1425 ft.

KINGMAN COUNTY—Kingman Oil Co.'s Wetherall 1, ne ne sw 20-28s-10w, rig.

McPHERSON COUNTY — Palmer Oil Corp.'s Swenson 1, ne ne sw 11-18s-3w, sd 3018 ft. Shell's Wenger 1, ne ne ne 2-20s-1w, 60 bbls oil and 60 bbls water, treated with 1000 gals. acid, no test. W. C. McBride's Mugler 1, se sw sw 22-20s-3w, dr 3250 ft.

NESS COUNTY—Phillips' Young 1, cnw sw 13-18s-21w, dr 3825 ft. Atlantic's Mark "A" 1, cse se 28-20s-23w, dr 3538 ft.

OSAGE COUNTY—Jim Edwards' Deitrick 1, cnw se 21-14s-15e, sd 800 ft.

PAWNEE COUNTY—Atlantic's Slepake 1, cne ne 15-23s-17w, coring 4189 ft.

RENO COUNTY — Privett Drilling Co.'s Crotts 1, ne nw ne 27-26s-10w, dr 4340 ft. Bradley's Olmstead 1, sw sw sw 22-22s-7w, rog. Mylius et al's Sprowl 1, ne nw ne 1-24s-5w, dr 2760 ft. Gypsy's Tonn 1, sw nw se 16-25s-4w, dr 180 ft.

RICE COUNTY—Allison & Fitzwilliams et al's Stumps 1, nw nw sw 4-18s-10w, td 3267 ft, pumped 218 bbls oil in 10 hrs. Foraker-Nickerson et al's Lyon 1, se se ne 27-20s-8w, dr 3582 ft. Vickers Pet. Co. et al's Gouldner 1, se ne nw 16-18s-9w, sd 2670 ft. Day's Mason 1, nw ne ne 28-21s-7w, dr 2400 ft. Fred Rust et al's Brown 1, ne ne ne 16-21s-6w, ru.

ROOKS COUNTY—Smith & Ash's Nelson 1, nw nw ne 27-10s-16w, sd 50 ft. Trees Oil & Findeiss' Johnson 1, sw sw se 26-10s-19w, dr 717 ft. Murfin et al's Wasthusin 1, ne ne se 19-9s-16w, lcn.

RUSH COUNTY—Boyle & Grossman et al's Yost 1, csw sw 23-17s-18w, dr 1025 ft. El Dorado Ref. Co.'s Stang 1, se se nw 36-17s-17w, dr 465 ft. Morgan & Flynn et al's Schlegel 1, se se nw 26-17s-16w, dr 3604 ft.

RUSSELL COUNTY—Wolf Creek et al's Penn Mutual 1, sw sw sw 22-15s-15w, run 8-in csg 2615 ft. Reserve et al's Moore 1, cnw nw sw 15-13s-12w, br. Bartman & Blair's Hildebrandt 1, nw ne sw 12-14s-14w, td 3345 ft, abd. Ryan Pet. Co.'s Newbold 1, nw se ne 25-12s-15w, co 2875 ft. Pryor & Lockhart's Spicer 1, ne ne se 21-11s-15w, ru. Hartman & Blair's Rexroot 1, ne nw nw 31-14s-14w, cellar. Wakefield & Armer's Hall 1, ne se sw 36-14s-15w, dr 1928 ft. Buffalo Oil Co.'s Kunz 1, ne ne sw 19-14s-15w, lcn. Vernon & Murphin's Becker 1, ne ne ne 32-15s-14w, dr 410 ft.

SEDGWICK COUNTY — Western Kansas O&R Co. et al's Betzen 1, se se ne 17-16s-13w, sd 3382 ft. Derby Oil Co. et al's Bartholomew 1, sw sw nw 8-27s-4w, mim.

STAFFORD COUNTY—Lario O&G Co. et al's Tudormorgan 1, se se nw 23-24s-13w, 2500 ft oih 4 hrs, no test. Davis et al's Riley 1, se se se 19-22s-11w, woc 232 ft. Empire O&R Co.'s Grove 1, ne ne nw 5-22s-11w, lcn.

SUMNER COUNTY—Shell's Green 1, se sw nw 3-33s-2e, dr 3235 ft. Allison & Fitzwilliam et al's Hitchcock 1-B, se se nw 16-30s-1w, cellar.

TREGO COUNTY—Jenmar Oil Co.'s Jones 1, se se se 30-12s-23w, co 3945 ft.

WOODSON COUNTY—Foster & Schultz' Ferguson 1, cs½ ne sw 12-26s-13e, dr 1225 ft.

ABBREVIATIONS

The following abbreviations, signs, etc., are used in completions and wildcat reports in THE OIL WEEKLY.

• —*dry hole abandoned well.*	owdd —*old well drilling deeper.*
‡ —*salt water (completions).*	owpb —*old well plugging back.*
† —*junked and abandoned*	pb —*plugged back or plugging back.*
¶ —*million feet of gas.*	r —*reaming.*
abd —*abandoned.*	rog —*rig on the ground.*
bbls —*barrels.*	rur —*rigging up rotary tools.*
br —*building rig.*	rust —*rigging up standard tools.*
b.s. —*basic sediment.*	sd —*shut down.*
csg —*casing.*	sdtr —*sidetracking.*
co —*cleaning out.*	sg —*show gas.*
dd —*drilling deeper.*	si —*shut in.*
dk —*derrick.*	so —*show oil.*
dr —*drilling.*	so & g —*show oil and gas.*
fsg —*fishing.*	spd —*spudding.*
ft —*feet.*	sr —*straight reaming.*
hfw —*hole full of water.*	sw —*salt water.*
in —*inches.*	td —*total depth.*
lcn —*location.*	ur —*underreaming.*
m —*milling.*	wih —*water in the hole.*
mim —*moving in materials.*	wo —*workover.*
mit —*moving in tools.*	wocs —*waiting on cement to set.*
mot —*milling on tools.*	wosr —*waiting on standard rig.*
n, s, e, w, —*north, south, east, west.*	
oih —*oil in hole.*	

OKLAHOMA

ATOKA COUNTY—Clark et al's Morrison 1, se se se 32-1n-14e, sd 200 ft.

BLAINE COUNTY—Earl Ingraham's Masters 1, sw nw nw 27-16n-11w, dr 1240 ft.

BRYAN COUNTY—C. B. Welch's Collins 1, sw sw nw 19-8s-8e, sd 570 ft. Trio Oil Co.'s Gilbert 1, se se se 25-8s-7e, sd 603 ft.

CADDO COUNTY—Denver P. & R. Co.'s Sah-Cam 1, cse se 33-10n-10w, dr 5190 ft. H. W. Lee et al's Horton 1, ne ne ne 9-6n-13w, rust and sd. Lee et al's Stacey Ferrell 1, sw ne ne 3-6n-13w, sd 2280 ft.

CANADIAN COUNTY — Carl Larkin's Brobine 1, nw nw ne 33-13n-5w, dr 6031 ft.

CARTER COUNTY—Carter's Humble-Williams 1, sw ne sw 27-2s-3w, td 5717 ft. Waco Turner's Munson 1, ne nw ne 35-5s-2w, dr 3410 ft.

CLEVELAND COUNTY—Sinclair Prairie's Franklin Community 1, se nw se 21-10n-2w, dr 7100 ft.

COAL COUNTY — Carter et al's John Thompson 1, csl ne nw 34-2n-9e, lcn.

COMANCHE COUNTY — F. F. Stevens' Green 1, se se sw 2-1n-13w, dr 1572 ft.

GARVIN COUNTY—George Pace's Smith 1, sw sw ne 35-1n-1e, sd 2490 ft. Chas. E. Carter et al's Wood 1, nw sw se 5-4n-3e, sd 2405 ft.

GRANT COUNTY — Helmerich-Payne's Crouse 1, cne sw 29-25n-8w, dr 6116 ft.

GREER COUNTY—Ent & Camp's Siminton 1, sw sw se 29-5n-21w, dr 50 ft. Gled Oil Co.'s Leeker 1, se se se 5-4n-21w, lost hole 998 ft, skid mach 30 ft east and 10 ft south, digging pits. Fred Morgan's Carder 1, csw se 19-4n-22w, dr 1890 ft.

HUGHES COUNTY—Freeman et al's Kite 1-A, nw nw ne 8-6n-10e, sd 700 ft. Dandridge & Crane's Mead 1, nw nw ne 17-5n-9e, dr 1425 ft. Amerada's Adams 1-A, ne ne sw 31-9n-9e, flowed 111 bbls oil 17 hrs and produced 5 million feet gas. Texas Co.'s Keaton 1, nw nw sw 4-8n-10e, dr 2475 ft.

JACKSON COUNTY—Palo Duro Oil Co.'s Ealum 1, se se sw 15-2n-21w, td 1025 ft, ru to dd. Associated Oil Co.'s Harrell 1, ne ne sw 13-1s-21w, td 1240 ft, abd. Whatley & Whatley's Holt 1, nw sw se 20-1n-20w, sd 1430 ft. Buell et al's Kizzar 1, se se ne 2-2n-22w, dr 1910 ft. Gypsy's Boucher 1, nw sw nw 32-1n-19w, dr 1816 ft. Marshall & Burnham's Hess 1, ne ne sw ne 27-1s-20w, dr 1070 ft. Associated's Harrell 1-A, ne ne se 13-1s-21w, ru mach. Robberson & Suppes' Walker 1, sw sw sw 19-4n-20w, mach on lcn.

JEFFERSON COUNTY—Gypsy's James 1, sw se se 30-6n-6e, dr 1380 ft.

KAY COUNTY—Lindsay's Waggoner 1, nw nw ne 3-27n-1e, dr 500 ft.

KIOWA COUNTY — Henson & Patton's Beeler 1, ne ne ne 11-5n-15w, sd 517 ft. Buell & Herndon's Haught 1, se se ne 22-1n-16w, abd 841 ft.

LINCOLN COUNTY—Carter et al's McFarland C-38 1, sw sw ne 18-13n-4e, dr 5290 ft. Stanolind et al's Campbell 1, sw sw nw 3-14n-3e, so 5054-5072 ft, sw 5072-5075 ft. Carlock's Young 1, cn½ nw nw 23-15n-5e, spd; Cavanaugh 1, se se ne 31-15n-5e, td 3661 ft, rust. Texas Co.'s Palmer 1, se sw nw 28-14n-5e, rog.

LOGAN COUNTY — Sinclair Prairie & Slick-Urschel's Koatsch 1, sw sw sw 23-15n-3w, bailing 1000 ft mud in hole. J. C. Shaffer's Hammond 1, se se sw 10-15n-4w, dr 7005 ft. Houghton Royalty's Langston 1, sw sw se 13-17n-1w, br. Anderson-Kerr et al's Renfro 1, ne ne ne 33-16n-4w, dr 6278 ft. Mid-Continent's Community Nunn 1, se se nw 25-15n-1e, dr 2597 ft.

LOVE COUNTY—Amerada & Stanolind's Westheimer & Daube 1, nw se se 27-6n-2e, sd 790 ft.

MAJOR COUNTY—I. T. I. O. & Continental's Fairview 1, csw se 32-33n-14w, rur.

MARSHALL COUNTY—Paul Robb's Vittetoe 1, cne se 11-5s-4e, sd 5461 ft.

McCLAIN COUNTY—Anderson & Kerr's Newburn 1, nw sw ne 24-5n-3e, td 2945 ft, pb 2700 ft.

McCURTAIN COUNTY—Schrivner et al's Central Life 1, ne sw sw 24-6s-21e, dr 956 ft.

MURRAY COUNTY—Equitable Oil & Gas Co.'s Ferguson 1, ne ne sw 26-1s-3e, sd 465 ft. Bland et al's Center 1, ne ne ne 6-4s-2e, rur.

OKFUSKEE COUNTY — Amerada et al's Jaynes 1, nw nw sw 20-10n-10e, pb 3883 ft, wocs.

OKLAHOMA COUNTY—Atkinson et al's Reed 1, ne ne ne 4-12n-3w, td 6954 ft, abd. Gypsy's Schock 1, nw sw sw 2-14n-3w, dr 5825 ft. Sinclair Prairie's Corbett 1, ne nw ne 17-13n-3w, dr 4435 ft. Slick-Urschel et al's Owen Community 1, se se se 19-13n-3w, dr 4070 ft.

PAWNEE COUNTY—Trees Oil Co.'s Susan Wedd 1, cse se 27-24n-5e, dr 1415 ft.

PONTOTOC COUNTY — Paramount Oil Co.'s Graham 1, sw se sw 13-1n-7e, td 3478 ft, pb, shot 10 qts at 2480-2500 ft, treated with 1000 gals acid, dry. Gillette & Kroeger's Duver 1, nw nw se 36-1n-6e, sd 1300 ft. Fleetborn

Oil Corp.'s Oliver 1, ne nw se 21-4n-5e, td 2229 ft, pb 1665 ft, ru. Phillip Boyle's McCracken 1, ne nw nw 3-15n-4e, run 7-in csg 2170 ft. Marcum's Magnuson 1, sw se se 23-2n-7e, td 1930 ft, dd. Continental's McCarthy 1, csw nw 12-1n-7e, ru.

POTTAWATOMIE COUNTY — James et al's Neal 1, nw se sw 4-5n-3e, td 2675 ft, pb 2600 ft, rip 8-in csg 2666-2667 ft, testing. Howard Sherman et al's Wingo 1, ne nw se 32-10n-5e, treated 1000 gals acid 40 bbls oil, testing.

PUSHMATAHA COUNTY—William Ungerman's Messer 1, se sw sw 35-3s-18e, td 2990 ft, pulling 6-in csg to straighten hole.

SEMINOLE COUNTY—Sovereign Drilling Co. et al's Thomas 1, nw nw se 8-6n-7e, sd 3950 ft. Cooper's Chandler 1, ne se sw 4-5n-6e, sd 1780 ft.

STEPHENS COUNTY—Wm. Angle et al's Cooper 1, ne nw nw 23-2n-7w, td 3406 ft, mir to dd.

TILLMAN COUNTY—Laper et al's Conrad 1, ne ne ne 35-1s-19w, sd 1320 ft. Rock Island Ref. Co.'s Lynch 1, cse sw 35-1s-16w, mach. Cockburn & Boose's Nichols 1, se se se 28-2s-19w, dr 1170 ft.

CALIFORNIA

KERN COUNTY

ALPAUGH—Trico O&G Co.'s No. 4, 3-25-23, rigged.

ARVIN—General's Mattson 1, 1-32-29, dr sand 3380 feet. Hall-Baker Co.'s Corehole 4-4, 16-31-30, pumping mud, water, little oil, 1270 ft; DiGiorgio 1, 17-31-30, spudded.

BELRIDGE—Continental's Mayhan 1, 7-28-20, dr 3750 ft.

BUENA VISTA LAKE—Shell's B. V. A. 1, 9-32-25, td 6112 ft, wocs 9⅝ in 5950 ft.

CALIENTE—Woodward Oil Co.'s Batz 1, 36-29-29, td 617, pulled 8⅝ in and 6⅝ in wocs, 8⅝ in 466 ft; S. P. 2, 31-29-30, co 497 ft.

COMANCHE POINT — Tejon Ridge Oil Co.'s No. 1, 23-32-29, dr sandy shale 1906 ft.

EDISON — Mountain View Dev. Corp's Spangler 1, 12-30-28, to test on pump 5122 ft. Woodward Oil Co.'s Goldber 1, 36-29-29, sp.

GRAPEVINE—Silver Gate Oil Co.'s Tejon 1, 7-10-19, skid rig from old Badger Oil Co. No. 1.

GREENFIELD—Big McKittrick Oil Co.'s Houghton 1, 7-31-28, dr shale 6270 ft.

KERNELL—Standard's Rideout 1, 34-24-23, rig; Widgeon 1, 1-25-23, coring blue shale 3155 ft; Widgeon 2, 12-25-23, rur.

LOST HILLS—Standard's United 1, 2-26-20, td 3576 ft, wocs 13⅜ in 3576 ft.

SEMITROPIC—Fullerton Oil Co.'s No. 27, 14-27-23, rig; No. 76, 1-27-22, rur. Standard's Goldman 1, 5-27-23, dr blue shale 2492 ft; Towle 1, 7-27-23, rig.

SOUTH DOME—Continental's Gatchell 28-7, 7-25-20, dr 5625 ft.

TEMBLOR HILLS—Robt. Foster's No. 1, 2-32-22, dr brown shale 2797 ft.

WHEELER RIDGE—Reserve O&G Co.'s Tejon Ranch 1, 2-10-19, td 3708 ft, redr 2685 ft, shale and oil sand.

KINGS COUNTY

ALPAUGH—Trico O&G Co.'s Magee & Stone 3, 36-24-22, sd 4821 ft.

MISCELLANEOUS

FRESNO COUNTY—Milham's Ora Loma 1, 12-12-11, dr sandy shale, sg 4405 ft. Taft Well Drlg. Co.'s Kreyenhagen 1, 33-22-16, dr 560 ft.

HUMBOLDT COUNTY — Texas Co.'s Eureka 1, 1-3-2, dr sandy shale 5885 ft.

SACRAMENTO COUNTY—Great American Pet. Co.'s Howard 1, 25-2-8, dr hard gray sd 2960 ft.

SAN JOAQUIN COUNTY—Amerada's F. D. L. 1, 15-2-5, coring sand and shale sg 4286 ft.

SUTTER COUNTY—Buttes Oilfields' No. 3, 35-16-1, rur wells Nos. 1 and 2 to furnish gas to dr No. 3, using same equipment.

TULARE COUNTY—Kabella Oil Co.'s No. 1, 12-23-27, sd 720 ft. Kings River Oil Pool's No. 1, 29-16-23, td 3165 ft, top slate 3050 ft.

MONTEREY COUNTY—Shell's Branch 1, 34-24-10, dr sand and shale 1206 ft.

SANTA BARBARA COUNTY

GOLETA—West Elwood Oil Co.'s Simonds-Campbell 1, 9-4-28, td 3700 ft, wocs 6⅝ 3600 ft.

LOMPOC—M. J. Freeman's La Brea 1, 11-7-23, dr shale 720 ft. Lompoc Pet. Co.'s Beauterbough 2, 18-7-34, sg 3510 ft, to test.

NAPLES—Scully & Snyder's No. 1, 7-4-29, sd 6267 ft.

SANTA BARBARA—M. & L. Oil Co.'s Domerick 1, 29-4-27, dr gray sand 1980 ft.

SAN LUIS OBISPO COUNTY

CHOLAME—Willett Oil Assn.'s Jack 2, 10-25-15, sd 3560 ft.

VENTURA COUNTY

BARDSDALE—El Rancho Oil Co.'s Elkins 1, 9-3-19, dr sand and shale 1068 ft. Union's Dryden 1, 12-3-20, dr hard shale 1456 ft.

CONEJO — International Oil Developer's Powell 1, 33-2-20, bailing, so 2375 ft.

LAS POSAS—Las Posas Pet. Co.'s Mahan 1, 22-3-20, fsh 8120 ft.

OJAI—Continental's Pirie 1, 12-4-23, 273 bbls oil 2241 ft.

PIRU—Bachman Pet. Co.'s No. 14, sd 5050 ft.

SANTA PAULA — High Mesa Oil Co.'s Butcher 1, 16-4-22, dr red shale 405 ft. Edw. M. Lesperance's Boosey 1, 31-4-20, dr shale 1250 ft. J. W. Mosher's No. 1, 22-4-21, sd 2300 ft.

SESPE—E. R. McClellan's No. 1, 4-4-19, rig. Supreme Oil Co.'s No. 1, 1-4-20, r 247 ft.

SHIELLS CANYON—Texas Co.'s Shiells 128, 4-3-19, dr sandy shale 6626 ft.

SIMI—Dawson Oil Co.'s No. 1, 8-2-17, swabbing water and trace of oil 1910 ft. Paloma Oil Co.'s Paloma Marr 1, 12-2-18, sd 995 ft.

SOUTH MOUNTAIN—Calco Pet. Corp.'s No. 2, 17-3-20, sp.

SOUTHERN CALIFORNIA

ARTESIA—Vanco Dev. Co.'s Millard 1, 25-3-12, dr hard shale and sand 3590 ft.

BANDINI—West American Oil Co.'s Bandini 1, 17-2-12, bldg rig. Western Gulf Oil Co.'s Vail 1, 16-2-12, dr shale 2865 ft.

BREA CANYON—Pressel-Perry-Tull's Baird 1, 30-2-9, sd 4176 ft.

EL SEGUNDO—Republic Pet. Co.'s No. 1, 18-3-14, sd 5004 ft.

FAIRVIEW—Explorers Drlg. Co.'s Norris 1, 9-6-10, sd 960 ft.

HUNTINGTON BEACH—Black Eagle Oil Co.'s No. 1-B, permit 194, 32-5-11, co 4702 ft.

MANHATTAN BEACH—Bethlehem Explor. Co.'s Martin 1, 30-3-14, coring 6860 ft.

NEWPORT—Si Rubens' No. 1, 14-6-10, sd 2574 ft. Wilshire Oil Co.'s Newport 1, 29-6-10, dr brown shale 435 ft.

PICO—Frontier Oil Co.'s No. 1, 12-2-12, dr sand and shale 3560 ft.

SAUGUS—Barstow Oil Co.'s Walker 1, 35-5-16, dr hard sand 3270 ft. International Oil Developers' Powell 1, 34-5-16, td 4339 ft, testing 2250 ft to 4000 ft.

SAN BERNARDINO COUNTY — Great American Pet. Co.'s Gapco D-1, 18-2-8, dr hard gray sand 545 ft.

WEST TEXAS

ANDREWS COUNTY—Fuhrman Pet. Corp.'s W. T. Ford 2, se¼ sec 16, blk A-43, PSL sur, top anhydrite 1703 ft, top salt 1747 ft, dr 2370 ft. Honolulu Oil Corp.-Llano Oil Co.'s J. E. Parker 1-B, nec w½ ne¼ sec 11, blk A-43, PSL sur, elev 3218 ft, top salt 1978 ft, dr 2210 ft. Humble's R. M. Means 4, cse sw sec 4, blk C-45, elev 3185 ft, dr 3900 ft. Republic Prod. Co.'s W. H. Boner 1, sec 25, blk A-43, PSL sur, sp. Lou Stogner et al's C. C. George-TP Coal & Oil Co. 1, se¼ sec 25, blk A-22, PSL sur, lcn. J. W. Tripplehorn et al's C. E. Ogden-Humble 1, sec sw¼ sec 6, blk A-46, PSL sur, sd 110 ft. E. M. Wahlenmaier

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Pet. Corp.-York & Harper's O. G. Bitler-J. F. Getty 1, c ne¼ sec 10, blk A-32, PSL sur, dr 1410 ft. E. M. Wahlenmaier Pet. Corp.'s R. A. Cox-Humble 1, c nw¼ sec 8, blk A-33, PSL sur, lcn.

BREWSTER COUNTY—Floyd C. Dodson et al's Texas American Synd. 1, c ne ne sec 66, blk 10, H&GN Ry. sur, deep test, fsh 950 ft. C. M. "Dad" Joiner et al's W. J. McIntyre 1, se¼ sec 31, blk 352, W. J. Mitchell sur, sd 2150 ft. K. H. King & C. R. Franklin's A. S. Gage 1, nw¼ sec 138, blk B-22, GH&SA sur, dr 900 ft. S. G. Smith et al's Mrs. Ed Decie 1, nwc se¼ sec 7, blk 1, G. T. Ry. sur, dr 825 ft. G. H. Storey et al's Jim P. Wilson 1, c se nw sec 3, blk 212, T&St. L. Ry. sur, sd 765 ft.

COKE COUNTY—C. D. Hagerty et al's S. W. Gaston 1, Jos. Young sur 11, elev 2022 ft dr 3000 ft.

CRANE COUNTY — American-Liberty Oil Co. et al's J. B. Tubb-Humble 1, swc sec 11, blk B-27, PSL sur, dr 1875 ft. Dobbs Oil Co.'s Jax Cowden 1 (1120-ac), sec N½ sec 38, blk 1, H&TC Ry. sur, machine. Gulf's W. N. Waddell et al 1, c nw nw sec 4, blk B-27, PSL sur, Ordovician test, elev 2554 ft, top salt 510 ft, sd for heavy duty rotary from Mexico, td 4595 ft; Henderson 1, c se¼ sec 3, blk B-23, PSL sur, dr 1110 ft; M. B. McKnight 1, c sw sw sec 9, blk B-21, PSL sur, top salt 615 ft, dr 2470 ft. Magnolia's W. P. Edwards 1, se¼ sec 2, blk B-23, PSL sur, dr 515 ft.

CROCKETT COUNTY—E. C. Leslie & Hiller's J. S. Todd 1, sec ne ne sec 26, blk WX, GC&SF sur, fsh 715 ft.

CULBERSON COUNTY—Anderson-Prichard Prod. Corp.'s H. A. Borders 1, nw¼ sec 34, blk 249, GB&CNG Ry. sur, elev 4565 ft, dr 1255 ft. Miller et al's fee 1, sec 21, blk 97, PSL sur, sd 2137 ft. Nelwood Drl. Co.'s A. L. Hall 1, sec se¼ sec 11, blk 54½, PSL sur, sd 200 ft.

JEFF DAVIS COUNTY — C. M. "Dad" Joiner et al's Jones-Coffield 1, ne¼ sec 8, blk 3, H&TC Ry. sur, sd 1105 ft.

DAWSON COUNTY—O. F. Dickenson, Tr., et al's C. H. Doak 1, e part sec 43, blk C-41, PSL sur, lcn.

ECTOR COUNTY—Empire Gas & Fuel Co.'s H. E. Cummins 1, sec se¼ sec 10, blk 44, T&P Ry. sur, T-1-N, elev 3234 ft, top anhydrite 1397 ft, top salt 1420 ft, top Yates sand 2660 ft, dr 3810 ft. Gulf's C. A. Goldsmith 1, c nw sec 10, blk 44, T&P Ry. sur, T-1-S, elev 3112 ft, top anhydrite 1482 ft, top salt 1518 ft, top Yates sand 2765 ft, top lime 3750 ft, trace oil 4135-40 ft, dr 4155 ft. International Pet. Corp. O. C. Harper's E. F. Cowden 1, c se se sec 25, blk 44, T&P Ry. sur, T-2-S, elev 3019 ft, top anhydrite 1605 ft, top salt 1645 ft, top lime pay 4147 to 4330 ft, shot 720 qts nitro at 4137-4330 ft, flooded 250 bbls. Landreth Prod. Corp. et al's Cowden Hrs. 1, swc sw¼ sec 18, blk 44, T&P Ry. sur, T-1-N, elev 3192 ft, top anhydrite 1425 ft; top salt 1445 ft, top Yates sand 2648 ft, top brown lime 3705 ft, dr 4160 ft; Clarence Scharbauer 1-A, SEc nw¼ sec 13, blk "A", PSL sur, dr 2100 ft. Neville G. Penrose et al's TP Land Trust 1, nwc w½ se¼ sec 31, blk 45, T&P Ry. sur, T-1-S, elev 3145 ft, top anhydrite 1290 ft, top salt 1375 ft, top lime 3895 ft, dry and abd 4505 ft.

EL PASO COUNTY — Tri-State Oil Co.'s Chas. & L. M. Kinkel 1, nec sec 237, S. F. No. 7232, sd 225 ft.

FISHER COUNTY—Tide Water & Merry Bros. & Perini, Inc.'s W. E. Hittson 1, ne¼ sec 177, blk 2, H&TC Ry. sur, dr 520 ft. E. M. Campbell et al's D. F. Maberry 1, J. F. Newman sur, lcn. Russ Pet. Co.'s M. S. Reynolds 1, sec e½ sw¼ sec 3, blk "R", W. E. Richardson sur, sp.

GARZA COUNTY—M. L. Richards et al's J. R. Sullivan 1, nwc sec 3, S. E. Harper sur, A-1118, top salt 920 ft, dr 2455 ft.

GLASSCOCK COUNTY — John I. Moore-Loffland Bros. et al's L. S. McDowell 1, c se ne sec 22, blk 34, T&P Ry. sur, T-2-S, elev 2534 ft, top lime 2137 ft, top Crinoidal lime 9471 ft, sd for new drilling contract, td 9946 ft.

HAMILTON COUNTY — Ireland O&G Co.'s Geo. L. Doyle 1, Isaac Adams sur, elev 1055 ft, top Caddo lime 3050 ft, so&g 3230 ft, dr 3255 ft.

TOM GREEN COUNTY—J. F. Jacobs et al's H. G. DeLong 2, Geo. Smith sur No. 1825, dr 175 ft. Eugene Mays and Amber Pet. Co.'s Ike Funk 1, near c nw sw sec 38, blk 5, H&TC sur, lcn.

JONES COUNTY—John Choate et al's C. H. King 1, sec 213, E. T. Ry. sur, lcn. Dr. C. E. Johnson et al's W. T. Young 1, blk 190, B. Trevino sur, dry and abd 2003 ft. Putman Oil Co.'s J. J. Steele 1, lot 8, C. Allen sur No. 10, A-500, dr 1575 ft. Shappell Oil Co.'s J. J. Steele 1, ne¼ sec 10, blk 15, T&P Ry. sur, elev 1734½ ft, dry and abd 2504 ft.

LOVING COUNTY—Mason Oil Co.'s M. Kyle 1, c nw se sec 22, blk 55, T&P Ry. sur, Tsp. 1, rust 1525 ft. Porter Rankin et al's W. D. Johnson 1, nw¼ sec 12, blk 57, T&P Ry. sur, Tsp. 1, dr 2085 ft.

LYNN COUNTY—E. T. Hart & Wanete Oil Co.'s C. O. Edwards 1, se¼ sec 29, blk 1, L&SV Ry. sur, elev 3112 ft, top white lime 4140 ft, fsh 4830 ft.

MARTIN COUNTY—S. E. Wright & Ralph Scott's F. W. Flanagan 1, nec sec 22, blk 37, T&P Ry. sur, T-1-S, sp and sd.

PECOS COUNTY — Cardinal Oil Co.'s White-Baker 1, lse. 2, sec w½ sec 45, blk "Z", T. C. Ry. sur, machine. Gulf's White-Baker 5, nec ne¼ sec 88, blk 194, GC&SF Ry. sur, elev 2981 ft, top lime 1938 ft, show o&g 1958-88 ft; dry and abd 2051 ft; White-Baker 6, c nw nw sec 94, blk 194, GC&SF Ry. sur, machine. C. W. Richards et al's W. Courtney-Pryor 4, lcn. Trans-Texas Oil Co.'s C. M. Caldwell 1, sec sec 27, blk 50, T&P Ry. sur, Tsp. 9, dr 2060 ft.

REAGAN COUNTY—Byrd-Frost, Inc.'s O. F. Boyd 1, c se sec 6, blk "E", L&SV Ry. sur, top salt 1238 ft, elev 2669 ft, top anhydrite 1165 ft, sd 2907 ft. Dobbs Oil Co.'s W. E. Friend 1 (681-ac), nwc s½ sec 3, Wm. Allen sur, elev — ft, top salt 1060 ft, ur 2300 ft. John W. Emch & Plymouth Oil Co.'s Mrs. E. V. Belcher 1, se¼ sec 4, blk 4½, GC&SF Ry. sur, 8 mi nw Big Lake field, sp and sd. Skelly Oil Co. et al's University-Utah 1-D, c sw nw sec 33, blk 8, Ordovician lime test, elev 2891 ft, top Cisco 9174 ft, top Simpson 9400 ft, tested sw at 9967 ft, pb to 3275 ft and sd.

REEVES COUNTY—J. E. Cunningham & A. R. Eppenauer Drlg. Co.'s Tiller Bros. 1, R. P. Altman & C. C. Wyatt sur, elev 2908 ft, top Deleware lime 3795 ft, top sand 3810 ft, show gas in black lime 4014-20 ft, sd 4091 ft. Kenneth Slack & L. M. White's Francis Reeves 1, c se nw sec 20, blk 56, PSL sur, sp and sd. Herbert Oil Co. et al's E. M. Williams 1, sec 17, blk 6, H&GN Ry. sur, dr 1380 ft. R. W. Clark et al's Radford Grocery Co. 1, sec 39, blk 56, PSL sur, lcn.

SCHLEICHER COUNTY—J. M. Cooper et al's Bert Page 1, near c nw¼ sec 40, blk "L", GH&SA sur, Ordovician lime test, elev 2270 ft, dr 6060 ft. J. D. Wesner, W. C. Proctor et al's Judkins-Spencer (Pure) 1, c sw¼ sec 4, Hooper & Wade sur, blk "A", deep test, jkd 212 ft, skid rig.

SCURRY COUNTY—H. H. Coffield & W. S. Guthrie's E. L. Goos et al's J. E. Murphy 1, nec w½ ne¼ sec 114, blk 97, H&TC Ry. sur, dr 755 ft. C. T. McLaughlin et al's W. C. Allen 1, c ne¼ sec 398, blk 97, H&TC Ry. sur, top salt 772 ft, dr 1995 ft. Magnolia's J. Wright Mooar 1, ne¼ sec 342, blk 97, H&TC Ry. sur, rog.

STONEWALL COUNTY—Merry Bros. & Perini, Inc. & Humble's C. L. Williams 1, sec 6, blk "C", AB&C sur, dry and abd 3430 ft. Barnsdall Oil Co.'s J. Young 1, nec blk 26, Austin-Williams sur No. 348, sp and sd.

SUTTON COUNTY—Paul C. Teas et al's C. E. Mower 1, c ne sw sec 39, blk 5, TW&NG Ry. sur, Ordovician lime test, top lime 3268 ft, top Ellenberger 4520 ft, sd 4750 ft; G. S. Allison 1, sw¼ sec 49, blk "A", GWT &P Ry. sur, lcn.

TAYLOR COUNTY—H. Crissman et al's Abilene fee 1, near c se¼ sec 66, BAL sur, sd 1750 ft. Eastland Oil Co. & Geo. C. Meredith's C. R. Tittle 1, c nw nw sec 37, blk 19, T&P Ry. sur, lcn abd. Skaggs & Brewer's McClure & Young 1, nec sec 8, L. A. L. sur, rig.

TERRY COUNTY—R. C. Burleson et al's C. H. Earnest 1, nec sec 17, blk "M", T&T sur, lcn

UPTON COUNTY—Baldridge Oil Co.'s S. Peck 1, sec se¼ sec 29, blk 41, T&P Ry. sur, T-4-S, elev 2890 ft, top anhydrite 1735 ft, salt 1785-2720 ft, top Yates sand 2865 ft, top brown lime 2880 ft, dr 4175 ft. Gulf's J. T. McElroy 103, c nw sw sec 197, blk "F", elev 2625 ft, top lime 2620 ft, top Ordovician 11,347 ft, top Simpson 11,510 ft, top Ellenberger 12,652 ft, run 2½-in tubing to test porous lime 12,720 ft. Humble's L. W. Pollok-Gulf 1, c nw sec 4, blk "M", EL&RR sur, Ordovicion lime test, top salt 1670 ft, top Yates sand 2560 ft, dr 4975 ft.

WARD COUNTY—Magnolia's Geo. Sealy 1-43, nwc sw¼ sec 43, blk "F", top anhydrite 1036 ft, dr 2055 ft. Rector Oil Co. et al's Lee Monroe 2, e cor sec 2, blk 1, W&NW Ry. sur, top salt 2490 ft, tested salt water in Delaware 4755-60 ft.

WINKLER COUNTY—Barnsdall Oil Co.'s Brown-Altman 1-B, sec nw sec 6, blk B-5, PSL sur, dr 815 ft. Emperor Oil Co.'s S. M. Halley 1, sec n½ se¼ sec 12, blk B-12, PSL sur, machine. Fox-Butler & Jefferies' Brown-Altman 2, machine. Frank M. Greene et al's J. T. Cross 1, nec nw¼ sec 4, blk B-10, PSL sur, lcn. Joe C. Maxwell-Atlantic O. P. Co.'s Brown-Altman 1 (60-ac), sec lse. sec 6, blk B-5, PSL sur, dr 1000 ft. Gulf Prod. Co.'s Keystone Cattle Co. 1, nec nw¼ sec 10, blk B-3, PSL sur, rig; Keystone 2, nwc sec 17, blk B-2, PSL sur, rig. Sid Richardson et al's J. B. Walton-Pure 1, sw¼ sec 1, blk B-3, PSL sur, elev 2940 ft, top anhydrite 1131 ft, top lime 2115 ft, est. 30,000,000 ft dry gas 2945 ft, sd to install rotary and mud off gas from behind casing. Sayre Oil Co.'s L. Daugherty-TP Coal 1A, sec s½ se¼ sec 2, blk B-26, recem cas 2645 ft. Siosi Oil Co.'s J. C. Lovett 1, nec sec 36, blk B-26, PSL sur, making gas, fsh 2591 ft. Skelly Oil Co.'s J. M. Halley 2, ne¼ sec 25, blk B-11, PSL sur, elev 2726 ft, junked gasser, sd 3090 ft. Sun Oil Co.'s S. M. Halley 1, sec n½ sec 24, blk B-12, PSL sur, elev 2736 ft, top lime 2485 ft, showing o&g, dr 2800 ft. TP Coal & Oil Co.'s Lum Daugherty 1, sec n½ se¼ sec 2, blk B-26, PSL sur, dr 2780 ft. Roy A. Westbrook et al's L. Daugherty 1, nec w½ se¼ sec 11, blk B-26, lcn; T. G. Hendrick 1, nec nw¼ sec 14, blk B-26, lcn.

YOAKUM COUNTY—Honolulu Oil Corp. & C. J. "Red" Davidson's L. P. Bennett 1, c ne ne sec 678, blk "D", John H. Gibson sur, sd 118 ft.

EAST TEXAS

ANDERSON COUNTY—Gulf Production Co.'s W. B. Robinson 2 (100-ac), David Stilts sur, Camp Hill area, elev 630 ft, Pecan chalk 3982-4276 ft, top Austin chalk 5010 ft, dr 5050 ft. Southern Pine Lumber Co. 1-A (105-ac), H. Main sur, Camp Hill area, rog. Hunt Prod. Co.-Sun Oil Co.'s Mrs. Alice Scott-Pure 1 (300-ac), Jas. Crawford sur, Slocum area, elev 411 ft, Pecan chalk 4450-4648 ft, Austin chalk 5055-5217 ft, top Woodbine sand 5266 ft, tested sw 5264-5277 ft, also tested sw at 5307 ft, dr 5315 ft. C. L. Mahaney et al's Elkhart State Bank 1 (30-ac), P. Martin sur, Camp Hill area, lcn. R. B. Sanders et al's S. G. Moore 1 (28.83-ac), J. C. Rosson sur, Camp Hill area, lcn. Wayne Lawrence et al's Rocky Mountain School 1 (1.38-ac), Eli Faulkenberry sur, Camp Hill area, lcn. Tide Water and Texas Seaboard Oil Co.'s N. N. Wills 21-A, Cayuga field Trinity test, elev 308 ft, dr 7920 ft; C. T. Valentine 1 (301-ac), John Little sur, 9 mi n of Palestine, elev 454 ft, dr 2100 ft; John Smith 1 (49.1-ac) John Adams sur, Long Lake field gas unit, elev 294 ft, Pecan chalk 3458-3709 ft, Austin chalk 4711-4946 ft, top Sub-Clarksville sand 4957 ft, top Woodbine 5165 ft, top water sand 5453 to 5465 ft, pb to 5279 ft to make gasser.

BOWIE COUNTY—Tex-Ark Oil Co.'s J. B. Hamilton 1 (40-ac), Jessie Milam sur, elev 272 ft, dr 560 ft.

CAMP COUNTY—E. J. Moran, G. E. & Ray Hubbard's W. M. Mitcham 1 (100-ac), L. Rose sur, 1½ mi n of Newsome, lcn.

CASS COUNTY—J. M. Lapin and Penguin O&G Co.'s A. M. Rhyne 1 (570-ac), David Frazier sur, 3 mi w of Avinger, elev 357 ft, Pecan chalk 2451-2965 ft, top Blossom sand 3390 ft, dr 3760 ft.

CHEROKEE COUNTY—Florence Oil Co. & H. A. Baker's Tol Smith 1 (40-ac), Jose Pineda sur, 4 mi nw of Jacksonville, rig. Jack-

sonville O&G Corp.'s H. D. Henderson 1 (40-ac) J. Pineda sur, elev 409 ft, sd 693 ft. Killough et al's J. S. Strickland 1 (40-ac), Urian Moore sur, 7 mi nw Jacksonville, elev 433 ft, sd 3505 ft. Ponta Oil Co. et al's C. W. Darley 1 (35-ac), Cyrus Parks sur, 2¼ mi s of Summerfield, elev 434 ft, Pecan chalk 3584-3995 ft, top Austin chalk 4416 ft, dr 4550 ft. Cal T. Scott & Turpin's W. T. Whiteman-E. M. Decker 1 (30-ac), J. H. Armstrong sur, Rusk pool, rog. T. J. Wood & Young's New Birmingham 3-A (160-ac), Levi Jordan sur, Rusk pool, elev 478 ft, trace oil 4451 ft, dr 4500 ft.

ELLIS COUNTY—Ed. Murphree & Lon Coker's Coke 1 (30-ac), R. de la Pena sur, Austin chalk 622-1010 ft, sd 1545 ft.

GREGG COUNTY—O. T. Clark et al's T. G. Williams 1 (100-ac), David Hill sur, 3 mi ne Longview, elev 426 ft, Pecan chalk 2391-2985 ft, top Austin chalk 3447 ft, tested dry 3771 ft.

HENDERSON COUNTY—Edson Pet. Co.'s C. L. Loper 1 (3-ac), Isaac Clendennen sur, Cayuga area, lcn. O. M. Rector et al's C. L. Loper 1 (3½-ac), I. Clendennen sur, Cayuga area, lcn. Fred Upchurch et al's C. L. Loper 1 (3½-ac), I. Clendennen sur, lcn. H. M. Wilson et al's fee 1 (943-ac), Thomas Caro sur, 5 mi n Malakoff, dk.

HOPKINS COUNTY—D. A. Hale et al's L. N. Hall 1 (70-ac), A. Caro sur A-143, elev 506 ft, Pecan chalk 1825-2040 ft, top Austin chalk 2728 ft, sd 2950 ft.

HUNT COUNTY—D. T. Cauble et al's Y. B. Reed 1 (220-ac), F. Thweatt & C. B. Payne sur, 3 mi se Greenville, top Woodbine 2809 ft, top Red Beds 2874 ft, testing 3416 ft. J. F. Morrissey Co., Inc.'s P. B. Fry 1 (146-ac), Calloway Davis sur, 7 mi se Ladonia, dr 310 ft. H. G. Samson & Shawver's J. R. Phillips 1 (53 1/3-ac) W. L. James sur, elev 522 ft, top Austin chalk 1113 ft, dr 2100 ft.

KAUFMAN COUNTY—G. H. Germany et al's D. Clark-W. S. Kirby 1, S. Edens sur, sd 1780 ft. L. P. Kean et al's J. B. Hunter 1, R. Sowell sur, 4 mi s Terrell, elev 453 ft, top Austin chalk 1785 ft, sd 3400 ft.

LEON COUNTY — Killough & Tucker's J. W. Lee 1 (10-ac), Jacob Burleson sur, Buffalo area, rig.

LIMESTONE COUNTY—Dan H. Daugherty et al's Sallie Welch 1 (94-ac), Pedro Varella sur, Austin chalk 2350-2650 ft, top Woodbine 2890 ft, sd 3004 ft. J. W. Kemp Co.'s Vol DeLong 1 (40-ac), Pedro Varella sur, 2½ mi n Thelma, top Austin chalk 2205 ft, dr 2800 ft. J. Edward Mills et al's J. B. Hunt 1 (34¼-ac), Israel Woods sur, 3 mi ne Kosse, Pecan chalk 2010-2137 ft, Austin chalk 2780-3158 ft, top Woodbine sand 3578 ft, cem 5 3/16-in cas 3529 ft, td 3636 ft.

MORRIS COUNTY—Steve J. Rotondi et al's W. & C. Smith 1 (50-ac), M. C. Vela sur, 2½ mi sw Naples, sp and sd.

NAVARRO COUNTY—L. N. McCulloch et al's Berry Bros. 1 (35-ac), W. W. Moss sur, Austin chalk 751-1060 ft, sd 1182 ft. E. M. Thomason & Co., Inc.'s Celia Moran 1 (100-ac), Wm. Haggard sur, rig. Wiggins & Albritton's D. A. Donoho 1 (63½-ac) John Caudle & Highnote sur, 2 mi sw Corsicana, elev 467 ft, sd 1439 ft.

RED RIVER COUNTY—J. E. Dinger Oil Co.'s W. T. Norris 1 (351-ac), Joseph Guest sur, 1 mi s Detroit, elev 464 ft, Red Beds 1290-1413 ft, sd 1860 ft. A. M. Gibbons et al's B. A. Rust 1, (1915-ac), C. C. Welborn sur, s edge Avery, dk.

ROBERTSON COUNTY—H. L. Patton Co.'s W. H. & H. A. Ely 1 (616-ac), Antonio Manchaco sur, 5 mi se Hearne, elev 392 ft, top Carrizo 661 ft, sd 2336 ft.

RUSK COUNTY—Ben E. Lamb et al's Haywood Leath 1 (185-ac), L. J. Dooley sur, 2½ mi ne Pirtle sur, elev 370 ft, Pecan chalk 2418-2793 ft, Austin chalk 3352-3512 ft, sd 4750 ft. Stewart & Egan's Hall Wood 1 (847-ac), blk 12, Jose I. Sanchez sur, rog.

SMITH COUNTY—W. L. Cloud & A. G. Deck's Dora Kendall 1, John Williams sur, 3 mi e of Van field, sd 1650 ft.

TITUS COUNTY—Steve J. Rotondi et al's O. C. Lillianstern 1 (40-ac), W. H. Crawford sur, 5 mi se Talco, elev 301 ft, dk.

UPSHUR COUNTY—Thos. D. Humphrey et al's Claude Nation 1 (156.28-ac), Robertson Asher sur, 1½ mi n of Ore City, elev 332 ft, top Pecan chalk 2415 ft, tested sw in Woodbine sand 3712-20 ft, dry and abd.

VAN ZANDT COUNTY—Blackwell O&G Co. & Ike Rudman's J. F. Malone 1 (100-ac), J. Balch sur A-102, 2½ mi se Van, top Woodbine section 3640 ft, top sand 3710 ft, dr red beds 3840 ft. A. A. Geyer et al's J. E. Crim 1 (41.6-ac), Wm. Daniel sur, lcn. Newt Tidwell & W. J. Rogers' L. E. Breucher 1 (98¾-ac), David Clapp sur, 5 mi se Wills Point, elev 499 ft, top Pecan chalk 1984 ft, top Austin chalk 3014 ft, fsh 3215 ft.

WOOD COUNTY—Dean Bros. and Adkisson's W. H. Finklea 1 (175-ac), Benjamin Anderson sur, lcn.

HARRISON COUNTY—Roy C. Swails et al's Bonnie Pitts 1, sec G. W. Martins sur, resetting 10-in surf csg 170 ft. Hanover, Bergendall et al's Buchanan 1, W. M. McIlvain sur, sd 3682 ft. Hammonds & Williams' W. T. Cock 1, J. N. Sorrell sur, arr resume, td 2592 ft.

MARION COUNTY—Ed S. Holman's Lizzie Henderson A-1, R. Bennington sur, 6⅝ in csg set top PG after pb to 2445 ft, setting 4½ in liner to test.

PANOLA COUNTY—Flinchbaugh & McAneny's M. G. McCormick 1, Jas. P. McAdams sur, rur. G. F. Hudson's J. F. Nail 1, C. McCrary sur, elev 283 ft, claim so 2337 ft, set 4½ in csg 2300 ft, td 2337 ft.

SABINE COUNTY—Smithsonian Pet. Co.'s Hamilton 1, Jno. Haley sur, cored Wilcox sand, claimed so, ds test 858-68 ft, dry arr deepen, td 868 ft.

SHELBY COUNTY—I. M. Bradley et al's J. J. Ashberry 2, J. M. Mitchell sur, sd 3390 ft. C. E. Litchfield et al's W. C. Windham 1, A. H. English sur, rur.

SOUTH TEXAS

BANDERA COUNTY—Palm Winn Oil Co.'s R. B. Watson 1, sec 71, reaming 1700 ft. Plateau Oil Co.'s R. G. Garrison 1, sec 506, GC&SF sur, sd 3404 ft for rep.

BASTROP COUNTY—Judge R. L. Batts & Jake Jarmon's A. Paris 1, 110 ft w of creek and 330 ft sl of tr, J. Maximillian sur, ru. Malone & Owens' Spooner 1, L. Leverenz sur, dr 1275 ft. Marts & Beavens' W. L. Miller 1, blk 22, D. Dykes sur, fsh 3170 ft. Joe Mills et al's H. Litton 2, 620 ft sel, 850 ft swl of A. Navarro sur, lcn. Nelson Puett's Carroll 4, A. Mays sur, straightening hole 2228 ft.

BEE COUNTY — G. M. Church's J. C. Woods 1, 330 ft w of road and 330 ft nl of 427-ac tr, J. Ryan sur, 3½ mi s Beeville, mim. Dirks Bros.' I. J. Miller 1, C. Rivas sur, prep to mim. Judge Dougherty et al's Hicks et al 1, sec 45, J. M. Uranga gr, sp and set sur csg, re-dr. Falvey et al's S. D. Copeland 1, B. Q. Hadley sur, sp and sd. Felmont Corp.'s J. T. Earnest 1, Bee County School Land sur No. 17, td 5782 ft, run electric formation tester. A. Hartzendorf's Fee 1, G. A. Kerr sur, trying to test, td 3648 ft. Humble's Thompson 2, Garrett Roache sur, dr 5467 ft, stky shale. F. P. Hynes et al's T. M. Plummer 1, sec 33, Chessman sur, sd 1530 ft. Bryce McCandless J. J. Grissom 1, 330 ft sl and wl e 80 ac s 160-ac lease, W. W. Gant sur, ¾ mile ne Worth discovery well, lcn. Littlejohn et al's B. Borroum 1, making lcn in w portion Wm. McGill sur, nw Worth well. Sun Oil Co.'s J. T. Borroum 1, 990 ft nl, 330 ft el of tr. Baker sur, sw Caeser field, lcn.

BEXAR COUNTY — American Gas Co.'s Oliver 5, M. F. Rodriguez sur, sd 2715 ft for repairs. N. G. Carter's Bilhartz Bros. 1, F. Rolen sur No. 48, dr below 760 ft. J. B. Cunningham et al's L. F. Ridder 1, County Blk 5196, dr 325 ft. M. A. Frederich's Fee 1, F. Recardo sur, pull off 2 jts csg 1050 ft, now fsh. C. J. LeComte's Albert Herbst 1, 150 ft sl and wl of tr in Manuel Leal sur, 4 mi s S. A., lcn; Mayfield Park 1, sd 362 ft. McPhee & Briggs' Florence Lamb 1, M. de Luna sur No. 4, dr 2137 ft, streaks sand and shale. Mid-Tex Pet. Co.'s Walker 1, S. N. Dobie sur, dk and sd. Joseph H. Parker's M. McCloskey 1, F. A. Desaque sur, sd 300 ft. Carroll C. Raborn's Claud McCauley 1, Wm. Harris sur No. 52, dr 200 ft. Richcul Oil Co.'s McCullough 1, J. M. Baerrera sur, dr 450 ft. Rowan & Nichols Oil Co.'s A. Zigmond 1, A. Deffenbaugh sur, dr 800 ft.

BLANCO COUNTY—R. T. Rowe & W. E. Nixon's Polk Morrisey 1, 1000 ft el, 1600 ft nl of 222-ac tr in Thos. H. Webb sur No. 91, 2½ mi e Blanco City, sp.

CALDWELL COUNTY—Exploration Dev. Co.'s W. T. Mooney 1, Solomon Seal sur, sd 1065 ft. Ogden & Reed's T. H. Compton 1, P. Martinez sur, dr 1650 ft. Trail et al's A. B. Tiller 1, G. Hinds sur, prep to acidize 2612 ft. R. Y. Walker's Walker Bros. 2, S. Seal sur, dr 1650 ft.

CALHOUN COUNTY — Continental Oil Co.'s Am. Nat'l Realty Co. 2, ne ne sec 6, blk C, P. Garcia sur, dr 6375 ft. Crown Central Pet. Co.'s Willett Wilson Est. 2, 330 ft el, 1050 ft n of s cor of 26.7 ac tr in A. Esparza sur, mim. Halliburton Oil Co.'s D. Burton 1, Sanchez sur, testing 6240 ft. Adrian Moore's McAster 1, M. Sanchez sur, ru. Steinberger Pet. Corp.'s A. P. Hartman 4, 400 ft w of swl of Roemer tr and 600 ft sel of tr in M. Sanchez sur, lcn; W. A. Shofner 1, 466 ft sel and swl of 100-ac tr in M. Sanchez sur, lcn. Texas Co.'s Blardone 1, S. Shupe sur, coring 6535 ft, shale; R. Duelberg 1, M. Sanchez sur, sand 6377-78 ft, dst 6368-78 ft, 4 fourbles sw, will pb and test just above this level; Ada Foster 1, 466 ft sl and wl of 135-ac tr, A. Esparza sur, ru; Martin 1, Florentina Garcia League, sand 6323-29 ft, making dst; W. A. Shofner 1, 466 ft nel and midway between nwl and sel 50-ac tr, M. Sanches sur, dk. Tulane Gordon's W. A. Shofner 1, c blk D, Tilley sub of Port Lavaca townsite, M. Sanchez sur, ru.

DUVAL COUNTY—Mills Bennett's Duval County Ranch 2, sec 258, testing 1535 ft. Bridwell Oil Co.'s Sutherland 3, 1650 ft s & e 1 of sec 122, ru. Duval Oil Corp.'s Bishop Cattle Co. 1-A, 1650 ft el, 330 ft sl, sec 70, ru. Frank Gravis's J. W. Byland 1, 330 ft nl and wl blk 4, sec 78, mim. Harvey & Henderson's R. Serna, Jr., 1, 330 ft nl, 150 ft el of n½ nw¼ sec 384, mim. Humble O&R Co.'s Bank of Fredericksburg 1, 1650 ft sl, 990 ft el of sec 382, 1 mi sw Harvey & Henderson discovery, dk, comp water well. Intrepid Oil Co.'s Parr 2, sec 115, td 4072 ft, dst show 350 ft oil and 500 ft sw, in Hockleyensis, ream down for new dst. D. H. O'Byrne's Ball 1, sec 3, Agua Poquita gr, ru, water wells comp. Santa Clara Oil Co.'s Wood-Welder 1, sec 385, dr 1523 ft. Smith & Hamil's M. C. Hubbard 1, sec 77, sand 2664-78 ft, dst 750 ft oil, 50 lbs. 20 min, set csg, wocs. Tex-La Oil Corp. & Johnson Bros.' M. C. Hubbard 1, sec 84, standing 1500 ft oil will not build up enough pressure to flow, td 2803 ft.

FRIO COUNTY — Amerada Pet. Corp.'s Halff & Oppenheimer 4, A. H. Gibson sur, sec 15, dr 3307 ft, shale and lime streaks; W. H. Smith 1, J. N. Mason sur, dr 2890 ft, sand and sh. Shoemaker et al's M. Roach Est. 1, C. Wentzel sur No. 139, re-dr 3748 ft.

GOLIAD COUNTY—Service Drlg. & Royalty Corp.'s Woods & Young 1, M. J. Rios sur, 10 mi s Goliad, dr 450 ft.

GUADALUPE COUNTY — Gode et al's Hicks 1, E. de loa Santos Coy sur, mim. A. D. Locke's Mrs. N. S. Lowman 1, C. Campbell league, td 1810 ft, dr 1300 ft in sdtr hole. Minerals Corp. of Texas' Allen Phillips 1, Cortines sur, set sur csg, no further rept. Suttle et al's Baenzinger 1, A. O. Manchola sur, cement csg, 1783 ft, woc, td 2155 ft.

HIDALGO COUNTY — Bluff Pet. Co.'s Knowles 1, Sh 14, por 49, 3 mi sw Mission, mim. D. M. C. Oil Co.'s Daskam 1, blk 34, por 45, td 4114 ft, set 5 in csg to bottom, wocs, will perf 4109-14 ft. E. H. East, Tr.'s F. M. Carter 1, blk 19, Retama sub, Del Tule gr, dr 1640 ft, last rept. K. D. Harrison & D. D. Oil Co.'s Mrs. Lula George 2, 690 ft sl, 230 ft wl of sw 40-ac of tr 13, por 41, east outpost well Samfordyce, dk. Nedler & Graham's Osca Daskam 1, near center blk 42, por 45, ru. E. L. Smith Oil Co.'s A. Flores 1, 500 ft n of State Highway 4, 100 ft fr wl of tr 250, por 38, mim. Union Sulphur Co.'s ARGL&I Co. 1, tr 2297, lot 59, N. Capisallo dist., Llano Grande gr, td 6431 ft, wor; ARGL&I Co. 2, tr 2082, blk 86, N. Capisallo dist., Llano Grande gr, td 8044 ft, ru.

JACKSON COUNTY — Shell Pet. Corp.'s McCrory 1, sec 15, Morris & Cummings sur, dr 6576 ft.

JIM HOGG COUNTY—Darby Pet. Co.'s Holbein 1, blk 5, Los Animas gr, dk. Frenck Oil Co.'s East 2, blk 74, sh 2, Moritas gr, sd 550 ft. Miller et al's Yeager 1, blk 6, sec 20, dr below 3400 ft, last rept. Phillips et al's Allen 1, 600 ft sl and el, blk 293, Pippin sub, Randado gr, prep to mim. Sun Oil Co.'s T. T.

East 1, blk 18, sh 5, Santa Domingo De Arriba gr, dr 3772 ft, sdy sh.

JIM WELLS COUNTY—A. M. Hagan et al's Rob. Adams 1, sec 10, ru. Magnolia Pet. Co.'s A. D. Seeligson 6, V. Canale sur No. 218, dr 5005 ft. Maner & Shira 1, S. Bigham sur, dr 3500 ft.

KARNES COUNTY—American Liberty Oil Co.'s Wolfmuller 1, J. Johnson sur, td 3475 ft, completing in pb hole 3303 ft. Jim Kendrics et al's W. H. Radford 1, 330 ft sel, 990 ft nel of Morse Nichols sur, lcn. Luling O&G Co.'s W. W. Boyce 1, S. D. Still sur, dr 3370 ft. H. A. Pagenkopf's McAda 1, Carlos Martinez sur, sd 5256 ft to install new boilers.

KERR COUNTY — Jeff Love & Eastland Oil Co.'s Jeff Love 5-E, J. M. Martinez sur, sec 1594, recement cavity 5450 ft.

LA SALLE COUNTY — C. W. Beck's Rancho Feliz 1, sec 47, dr below 2125 ft. S. Killingsworth 1, lot 10, blk 5, sec 94, td 2001 ft, prep to run electric formation tester.

LEE COUNTY—James E. Pederson's C. A. Turner 1, D. Hudson sur, td 6560 ft, pb 6150 ft, perf csg 6060 to 5860 ft, show o&g 5937 ft, shot with nitro 6040 and 6020 ft, now prep to shoot again.

LIVE OAK COUNTY—Baugh & McMillan's Walton & Campbell 1, D. R. Fant sur, J. Campbell Ranch, dr 3575 ft. Henderson Coquat's L. A. Reagan 1, McGloin sur, dr 950 ft; H. E. Rex 1, GH&H sur No. 1, sand section 4369-75 ft, show oil, making dst. Feltner, Lefevre & Spice's Carter Inv. Co. 1, sec 299, Hooper & Wade sur, ru. Holland Oil Co.'s W. R. Lyne 1, 1320 ft sl and el S¼ Lyne sur No. 74, Ab. 763, lcn; Holland Oil Co.'s Moozygemba 1, 330 ft out of ne cor of lot 122, S. L. Williams sur No. 113, Geo. West sub, blk A, lcn; George West 1, 1320 ft sl and el of e¼ BS&F sur No. 255, Ab. 115, lcn. Houston Oil Co.'s Cartwright 32, M. Trudo sur, coring 5250 ft. Marine Oil Co.'s E. S. Adair 1, J. McGloin sur, dr 3100 ft. Smith & Storey's Nueces Valley Townsite 1, Jane Curry sur, dr 4600 ft. J. O. Whittington et al's Little 1, M. M. Shipp sur, td 5758 ft, sd.

McMULLEN COUNTY—Brown & Nessley's Worley 1, M. O'Boyle sur, sd for rep 660 ft. Henderson Coquat's Ezzell 1, D. R. Fant sur, sd 606 ft. John Gibson's G. C. West 1, blk 4, sec 14, HT&B Ry. sur 1092, re-dr 450 ft. Hall's Claunch 1, M. Hely sur, completing 784 ft. Howard & Carpenter's Jungman 1, M. Hely sur, testing around 780 ft. Loma Oil Co.'s L. Jacob 2-A, Benham sur No. 9, lcn, to start shortly. C. C. Shumway's Shiner Ranch 8, 330 ft el, 2310 ft sl of sec 53, Shumway sub, ru. Texio Oil Co.'s Atkinson 1, sec 13, M. J. Dean sur, re-dr 1810 ft.

MEDINA COUNTY—Joe Deupree et al's Hugo Batot 1, John Ball sur No. 1478, dr 235 ft. Shoemaker et al's Noonan 1, Alsbury sur No. 52, move in new rig to dd, td 450 ft.

NUECES COUNTY — Southern Minerals Co.'s Rand Morgan 1, lot 29, Elliott sur, dr 3785 ft.

REAL COUNTY—H. J. Heartwell et al's L. J. Haby 2, AB&M sur No. 175, re-dr 3056 ft.

REFUGIO COUNTY—Temple Hargrove et al's Weiss 1, sec 40, Bonnie View sub, dr 4594 ft. Humble O&R Co.'s Mrs. M. M. Marberry 1, J. Dunn sur, dr 5217 ft, hard sand. Magnolia Pet. Co.'s Mattie Wood 1, S. Turner sur, dr 7279 ft, shale.

SAN PATRICIO COUNTY—Conroe Drlg. Co.'s E. H. Welder 1-D, Portillo sur (formerly shown as Heep), set sur csg, wocs. Continental Oil Co. & Atkins & O'Neil's J. F. Welder 3, Juan Hart gr, sp. Heep Oil Corp.'s E. H. Welder 1-E, sec 46, Welder sub, R. Montgomery sur, reported testing sand below 5400 ft. Plymouth Oil Co.'s Welder 2-C, Morrow sur, dr 2300 ft; Welder 3-C, Morrow sur, dr 1800 ft; Welder 1-D, Portillo sur, sp.

STARR COUNTY—Armstrong, Emanuels & Adams' SCCC 1, blk 57, J. L. sub, por 89, td 2715 ft, perf csg 2704-10 ft, swabbed dry, now prep to perf 2712-15 ft. C. R. Borah et al's A. Guerra 1, sh 6, San Jose gr, dr 3050 ft. John Clopton's D. L. Tijerina 1, sh 14-C, por 80, dr 1850 ft; Kelsey Bass 1, blk 5, sec 10, por 86, dk, mir, lay water line. Conroe Drlg. Co.'s Guerra 1-A, blk 35, Crawford sub, por 56, dr 3010 ft. H. L. Curry's Kelsey Bass 2, sh 8, por 77, dr below 1200 ft. Hughston Oil Co.'s Wood-Gregg 1, por 84,fsh 920 ft. Hiriam Reed's Block Bros. 1, Tr 28-A, por 80, blk 4, td 1500 ft. Sun Oil Co. & Humble O&R Co.'s Mantor & Briggs 1, bw bw sec 53, dr 725 ft.

TRAVIS COUNTY — J. M. Hickey's A. Lind 1, M. Winburn sur, dr 1125 ft.

VICTORIA COUNTY—Costa Oil Co.'s J. E. Schovajsa 1, lot 14, Rupley sur, sand 4757-69 ft, four dst failed, now coring 4774 ft, sand. Gillespie & Superior's Brandt 1, lot 11, Rupley sur, sp; Farber 2, lot 6, Nancy Dean sur, dr 5700 ft. Houston Oil Co.'s Fagan 1, F. & J. M. Rodriguez sur, dr 1250 ft. Magnolia Pet. Co.'s Henderson & Pickering 1, E. Benavides sur, ru. The Texas Co.'s A. M. McFaddin 9, J. M. Rine sur, dr 3967 ft.

WEBB COUNTY—Carolina-Texas Oil Co.'s Barnhart 1, sec 262, de la Garza sur, comp fsh job 2405 ft. Payne et al's Hoggterp 1, blk 6, sec 1110, td 1920 ft, no rept. Arthur Wray's Stuempke 1, Falan Grant, no rept.

WILLACY COUNTY—Kingwood Oil Co.'s Stillman Ranch 1, lot 16, blk 30, sh 44, Stillman Ranch sur, dr 1625 ft. South Texas Dev. Co., F. Armendiez 1-A, Little Share 4, sd 4000 ft for repairs.

WILLIAMSON COUNTY—A. T. Parr et al's Dan Murphy 1, W. J. Cowan sur, dr 300 ft. W. L. Stephens et al's J. P. Carlson 1, 1850 ft sl, 200 ft wl of 120-ac tr, S. C. Jones sur, 10 mi sw Taylor, re-dr 45 ft. W. B. Stone & J. W. Gabehart 1, P. S. Wernli 1, 150 ft sl and el 28-ac tr in P. Cartwright sur, lcn. J. C. Tittle et al's J. R. Niezer 1, 150 ft nwl and nel of 124-ac tr, P. Zaraza sur, 4 mi w San Gabriel, lcn.

ZAPATA COUNTY—Allen & Morris' F. Pena 1, sh 19, por 19, dr 2500 ft. Cox et al's Yzaguire 1, sh 17, por 15, dr 600 ft. Danvers & Harrison's N. J. Vela 1, blk 7, Vela sub, por 29, coring 2350 ft. O. W. Killam's A. M. Bruni 10, 450 ft swl, 150 ft nwl of blk 60, Blas Uribe sub, Borrego gr, ru.

TEXAS GULF COAST

ANGELINA COUNTY—Hunter Co.'s Long Bell 1, six mi se of Huntington, J. Durst sur, sd 1901 ft. Lee Tex Oil Co.'s A. H. Geisler 1, 1 mi nw of Lay, S. J. Thompson sur, dr shale 1405 ft. Pioneer Exploration Co.'s S. L. & B. L. Huffman 1, 6 mi ne of Lufkin, S. Donegan sur, abd 1207 ft.

AUSTIN COUNTY—Deering & Kayser's T. A. McClenton 1, se of Bellville, Thos. Bell sur, dr shale 1325 ft.

BRAZORIA COUNTY—Texas Co.'s Freeport Sulphur Co. 1, 2500 ft e of Canal, Areola sur, dr shale 4180 ft. Turnbull & Irwin's Oliva Allison 1, Fresno area, H&TC sur, sec 79, lot 36, abd 6050 ft.

CHAMBERS COUNTY—South Gulf Oil Corp.'s R. M. White 1, Luke Bryan sur, cor 5160 ft.

COLORADO COUNTY—Gulf's A. R. Milentz 1, 1¼ mi ne of Rock Island, I&GN sur, sec 33, dr shale 4340 ft.

GRIMES COUNTY—W. B. Roan et al's G. W. Sealy 1, sw of Kellum Springs, B. F. Smith sur, abd 3278 ft.

HARDIN COUNTY—Jack Frazier's Sternenburg 1, nw of Kountz, J. Pearson sur, dr shale 6479 ft.

HARRIS COUNTY—Johnson & Johnson and Stanolind's Fee Land 1, s Houston, H&TB sur, wocs 4820 ft. West Prod. Co.'s O. P. Woodburn 1, Genoa, A. Whitlock sur, dr shale 5810 ft.

LIBERTY COUNTY—Liberty Independent Oil Co.'s J. M. Neal 1, S. Strong sur, sd 4061 ft.

MATAGORDA COUNTY — Continental's Feife 1, Citrus Grove, J. S. Chriswell sur, woc 150 ft. H. M. Smith's Wadsworth 1, S. F. Fisher sur, dr shale 8001 ft.

MONTGOMERY COUNTY—Gholson et al's A. Parker 1, nw of Willis, J. Lindley sur, dr shale 3715 ft. W. C. Keeble's T. S. Foster 1, J. M. De Garza sur, abd 5230 ft.

ORANGE COUNTY—T. S. Ruff's Kaulback 1, 4 mi e of Beaumont, J. Armstrong sur, drill stem stuck 2110 ft. Ellis Oil Co.'s G. W. Pell 1, J. M. McHernie sur, dr 2015 ft.

POLK COUNTY—Humble's Tex. L. L. Co. 1, e of Goodrich, A. Viesca sur, abd 4500 ft.

SAN JACINTO COUNTY—Turnbull & Irwin's Moore 1, J. D. Martinez No. 3 sur, dk.

TRINITY COUNTY — Gulf's Trinity Lbr. Co. 1, e of Apple Springs, J. M. Gomez sur, dr shale 1075 ft.

WALKER COUNTY — S. E. Grey's C. Weinzell 1, se of Riverside, J. J. Porter sur, dr shale 3860 ft.

WASHINGTON COUNTY—Powers Prod. Co.'s Boenker 1, w of Washington, J. Newman sur, dr 20 ft.

WHARTON COUNTY—Texas Co.'s Pierce Estate 2-A, I&GN sur, sec 39, dr shale 2220 ft.

LOUISIANA GULF COAST

ACADIA PARISH — Continental Oil Co.'s T. Ortigo 1, 6 mi nw of Iota, sec 28-7s-2w, dr sand and gravel 380 ft. Humble's Rice Milling Co. 1, s of Crowley, sec 27-10s-2e, dr shale 7925 ft.

BEAUREGARD PARISH—C. K. Dr. Co.'s Long Bell Lbr. Co. 1, w of Ludington, sec 26-2s-8w, sd 2882 ft.

CALCASIEU PARISH — Fred Oil Co.'s Faist 2, 900 ft se of No. 1, sec 26-8s-10w, dr shale 2890 ft. Wheeler Oil Co.'s School Land 1, s of Iowa, sec 16-9s-7w, no report.

CAMERON PARISH — Magnolia's Broussard 1, sec 13-12s-9w, dr hard sand 6880 ft.

EAST BATON ROUGE PARISH—Superior's Duplantier Community 1, University block, sec 65-7s-1w, dr shale 6634 ft.

EVANGELINE PARISH—Basile Oil Co.'s Haas 1, 6 mi se of Hampton, sec 14-6s-2w, dr water sand 2756 ft.

IBERIA PARISH—Texas Co.'s State Lake Fausse Point 1, on s flank of dome, sec 35-11s-8e, dr shale 4451 ft.

JEFFERSON PARISH—Texas Co.'s Bayou St. Denis 1, 6 mi se of Lafite, sec 19-17s-24e, flowing oil at the estimated rate of 1110 barrels per day, td 9572 ft.

ST. BERNARD PARISH — Emerald Pet. Co.'s Shell Beach Properties 1, s edge of Bayou Louis, sec 31-13s-15e, woc 800 ft. John Danciger's Battle 1, sec 23-8s-14e, dr sand 6890 ft.

ST. LANDRY PARISH—Woodley Pet. Co.'s Thistlewaite Lbr. Co. 1, Washington prospect, section 68-5s-4e, dr shale 5002 ft.

ST. MARTIN PARISH—Texas Co.'s State Blum Bob 1, Henderson, sec 9-8s-7e, shale 7751 ft. Same operator's St. Martin Land Co. 7, Henderson, sec 9-8s-7e, driving piling.

TANGIPAHOA PARISH—R. A. Conklin's Lake Superior Piling Co. 1, sec 19-5s-9e, abd 4359 ft.

NORTH LOUISIANA

BIENVILLE PARISH — N. V. Duncan et al's J. Hutton 2, nw ne sw 4-18n-7w, tested 3 fourbles oil, mud and sw 2797-2800 ft, arr abn, td 2845 ft, sandy shale. Saline Drlg. Co.'s Pardee 1, ne ne 27-14n-6w, sd 3819 ft.

BOSSIER PARISH—W. A. Kirklin, Tr.'s Garrett & McKellar 1, se nw nw 3-21n-13w, dr 1975 ft. Plain Dealing Synd.'s L. A. King 1, nw ne ne 36-23n-13w, dr 785 ft. Richplain Oil Co.'s Gaines 1, nw nw 22-22n-13w, wocs 10-in csg 42 ft.

CADDO PARISH—Ed Bailey et al's Hartzo 1, ne nw 28-22n-15w, sd 1230 ft. A. D. King, Tr.'s Roach 1, 4-14n-16w, dry at 2208 ft. Simplex Oil Co.'s Keith 1, sw se 18-20n-14w, dr 2405 ft. A. F. Tarver's George 1, sw ne ne 23-19n-15w, dry at 2420-24 ft, cemtd 6-in csg 2445 ft, testing td 2462 ft.

CALDWELL PARISH—Critchett & Wood's La. Cent. Lbr. Co. 1, se nw ne 18-11n-3e, 10-in csg 133 ft, dr 795 ft. G. W. Zeigen et al's La. Cent. Lbr. Co. 1, nw sw sw 25-13n-3e, spd dr 75 ft.

CATAHOULA PARISH—Phillipi et al's La. Cent. Lbr. Co. A-1, 2-9n-6e, 6-in csg 820 ft, dr 915 ft.

CLAIBORNE PARISH—J. C. King et al's Odis Webb 1, nw ne 21-21n-8w, owdd, dr 1904 ft lime. E. T. Oakes et al's Patton Est. 1, ne ne 1-20n-5w, rur.

DE SOTO PARISH—E. B. Bird et al's A. D. Johns, Jr., 1, se nw 20-14n-16w, elev 290 ft, top Nacatosh 1229 ft, base Annona chalk 1907 ft, top Blossom 2105 ft, cemtd 6-in csg 2583 ft, arr run liner to test, td 2613 ft. Century Oil & Drlg. Corp.'s J. M. Norton 1, sw se arr run tub to test again, td 2825 ft. Flesh & Hootkins' J. S. Farmer 1, nw se ne 14-12n-14w, 10-in csg 150 ft, dr 2390 ft. P. G. Frailey et al's J. E. Stell 1, 5-12n-16w, rur. Ed Saffold et al's T. D. Thigpen 1, nw sw ne 33-13n-13w,

cemtd 6⅝-in csg 1620 ft. Ben F. Smith et al's J. W. Porter 1, sw nw 23-12n-13w, rur.

EAST CARROLL PARISH—Century Oil & Drlg. Corp.'s Olivedell Pltg, Co. 1, 56-21n-12e, wocs 10-in csg 285 ft. O. G. Collins et al's H. L. Hunt 1, cent 26-22n-13e, spd dr 75 ft.

MADISON PARISH — Southern Land & Expl. Co.'s Deltic Inv. Co. 1, nw nw 1-17n-12e, dk and mir.

MOREHOUSE PARISH—C. I. Bacon et al's Crossett Lbr. Co. 2, se sw 36-23n-6e, dk. Alex Rice, Tr.'s Meyers 1, nw se nw 15-22n-7e, dr 2452 ft.

NATCHITOCHES PARISH—Clyde Creighton's Friedman Est. 1, swc 52-7n-6w, claim so co to make ds test, td 2947 ft. Edwards & Turner's Prudential Life Ins. Co. 1, nw nw 26-10n-6w, dk. Mike Kissick's Raines 1 (formerly Raines et al), 28-9n-10w, ow, fsg for junk, td 3560 ft. Leslie Prod. Co.'s Tom Moffitt 1, se nw 19-10n-10w, lcn. Missouri Drlg. Co.'s Brown Lbr. Co. 1, 5-10n-10w, co to deepen, td 1033 ft. B. E. Taylor's De Blieux 1, nwc 83-10n-7w.

RED RIVER PARISH—Sterling O&G Co.'s Long-Bell Lbr. Co. 1, se ne se 19-13n-9w, sd repr rig, td 2930 ft.

SABINE PARISH—M. T. Hines' J. B. Hill 1, sw ne 4-6n-11w, sd 2260 ft. Laurel Pet. Co.'s Long-Bell Lbr. Co. 1, sw sw 14-8n-14w, top Zwolle marl 1763 ft, wocs 7-in csg at 1791 ft, td 1793 ft.

UNION PARISH — Crescent Drlg. Co.'s Woolie 1, ne ne 34-19n-1e, rur.

WEBSTER PARISH—Virgil Likens' E. L. Stewart 1, nw nw 25-18n-10w, top Arkadelphia 1376 ft, top Nacatosh 2017 ft, sdtr junk, td 2020 ft.

ARKANSAS

ARKANSAS COUNTY—Grand Prairie Realty Co.'s Fischer 2, ne nw nw 6-6s-4w, rur.

ASHLEY COUNTY—Glen E. McFadin et al's Bovine Farms 1, ne ne 1-18n-8w, elev 178 ft, Nacatosh sand 2767-80 ft, sd for fsg tools, td 2798 ft

CALHOUN COUNTY—The Hunter Co.'s Stout Lbr. Co. 1, nw ne 33-16-13, ru and sd due high water.

COLUMBIA COUNTY — Southern States Gas Co.'s Pine Woods Lbr. Co. 1, sw ne nw 10-20-22, sd 950 ft.

GRANT COUNTY—Neill & Winters' R. W. Cooper 1, sw se 26-6s-15w, sd 1710 ft.

HEMPSTEAD COUNTY—F. W. Martin et al's A. J. Lafferty 2, se nw 17-14-24, dk.

LA FAYETTE COUNTY—W. H. Harvey's R. F. Allen 1, ne se sw 13-19-25, dk. Larry Romine's Nolte 1, ne ne nw 11-19-26, dr 3065 ft. S. H. Riggs et al's DuBose 1, se sw nw 35-15-24, sd 2590 ft. Transportation Pet. Co.'s Cochran Est. 1, ne se 25-19-25, lcn. Red River Lbr. Co. 1, sw sw 26-19-25, elev 250 ft, top Nacatosh 1804 ft, top Blossom 2740 ft, tested 6 fourbles mud and oil in ds test, 3330-75 ft in Tokio, arr test again, td 3375 ft.

LONOKE COUNTY—J. C. Strahan's Hardin 1, nw nw 18-2s-7w, fsg td 2323 ft.

MILLER COUNTY—C. J. Hodges et al's Commercial Nat. Bank 1, sw ne se 30-17-28, dk. King Oil Corp.'s E. G. Anderson 1, nw sw ne 16-14-27, dry 2208 ft, dr 2410 ft. Lee Timberlake et al's Frost Lbr. Co. 1, sw sw se 27-15-26, sd 3097 ft.

NEVADA COUNTY—Carnett et al's Floyd Munn 1, 16-14-22, sd 50 ft.

OUACHITA COUNTY — Snow-Black Pet. Co.'s O. F. Wyman 1, n½ sw 36-11-16, rur. Steele et al's Myar Est. 1, 16-13-18, wocs 10-in csg 100 ft.

SEVIER COUNTY—Pendleton & Vaughan's, Fee 1, nw se 35-9s-30w, rur. Harris Est. 1, 34-9s-30w, cemtd back to 1190 ft, bottom of 8-in csg, td 1320 ft.

UNION COUNTY—Gulf Ref. Co.'s Werner Lbr. Co. 49, sw nw sw 5-16-16, 10-in csg 2293 ft, dr 5867 ft, red shale and anhydrite. H. L. Hunt, Inc.'s E. F. Gregory 15, se se 10-17-14, elev 180.4 ft, 7-in csg 5834 ft, base red beds 5937 ft, top Permian salt 6816 ft, pb to 4000 ft and perf csg at 3450 ft, tested sw, blew with air still sw, dr back to 6900 ft, arr set 4½-in csg to test about 6430 ft in Big lime, old td 6911 ft, Permian salt. Mrs. R. K. Jones' J. Davis 1, nw nw 28-16-14, cemtd 6⅝-in csg 2746 ft, tested sw td 2765 ft, Joe Modisett et al's D. G. Sturdivant 1, se se 6-18-13, sd 4016 ft, sandy shale. E. O. Olds' Telford 1, nw nw 35-17-15, wosr td 2211 ft.

MISSISSIPPI

BOLIVAR COUNTY—White & Jones' Ballou 1, sw ne ne 18-24n-7w, 10-in surf csg 200 ft, dr 550 ft.

CLARKE COUNTY—L. Beckwith et al's Long-Bell 1, sw se 10-2n-16e, ru and sd.

JONES COUNTY—Snow-Black Pet. Co.'s Fox 1, se se sw 30-7n-12w, sd 4050 ft.

MADISON COUNTY—Cleve Love et al's P. F. Simpson 1, nw nw 30-8n-1w, lcn.

MONROE COUNTY—P. J. McAlpine et al's Crook 1, ne ne 4-13s-18w, re-cementing csg, td 2485 ft, sand.

RANKIN COUNTY — Cleve Love et al's Boehle 1, nw ne 18-5n-2e, elev 275 ft, top Cane River 720 ft, top Wilcox 1030 ft, wocs 6-in csg cemtd 2442 ft, top Midway chalk.

STONE COUNTY—Gulf Ref. Co.'s Dantzler Lbr. Co. 7, se se 36-3s-11w, fsg 3-in dr pipe, td 6192 ft.

WARREN COUNTY—Harry W. Elliott's R. L. Parker 2, nw nw 14-14n-1e, sd high water td 1602 ft.

WASHINGTON COUNTY — Mid-Continent Developments' Lee 1, 33-15n-8w, elev 124 ft, dr 1527 ft hd shale.

WINSTON COUNTY—Jack Vale's Moody 1, sw nw sw 3-13n-14e, elev 540 ft, dr 1338 ft (corrected depth).

ALABAMA

COVINGTON COUNTY—Geometer Prod. Co.'s A. B. Culbreth 1, sw sw ne 8-2n-14e, sd 5600 ft, repr rig.

HOUSTON COUNTY — Rice O&G Co.'s Oakley Est. 1, sw ne sw 9-3n-29e, sd 2750 ft, upper Tuscaloosa.

LAMAR COUNTY — DeSoto O&G Co.'s Gardner 1, nw nw 22-15s-16w, dr 4266 ft lime.

FLORIDA

HILLSBOROUGH COUNTY — Southern Pet. Co.'s Mizell & Williams 1, 4-32s-25e, elev 120 ft, re-conditioning hole, td 2100 ft.

LAKE COUNTY—Oil Dev. Co. of Fla.'s Gulf Expl. Co. 1, se se 17-24s-25e, re-landing 12-in csg at 435 ft.

MICHIGAN

MIDLAND COUNTY—J. V. Wicklund's Neal 1, 16n-2w-13, re-acidized, td 4026 ft. Goll-Graves-Mechling's Oviatt 1, 16n-2e-24, sd 3300 ft. Atha Oil Co.'s LaLonde 1, 13n-1e-27, sd 3490 ft; A. Moran 2, 13n-1e-28, lcn.

ISABELLA COUNTY — McClanahan Oil Co.'s McRae 1, 15n-3w-13, sp. United Driller's Vandercook 1, 15n-3w-24, dr 1300 ft. Atha Oil Co.'s Fordyce 1, 16n-5w, c-nw ne-34, mim.

OGEMAW COUNTY — Thompson Bros.' Mills Estate 1, 21n-4e-31, dr 2200 ft. Lupton Oil Co.'s Rakestraw 1, 24n-3e-35, lcn.

GLADWIN COUNTY—Beaverton Oil and Gas Co.'s Ross 1, 17n-1w-7, dr 3790 ft. Sun Oil Co.'s Hines 1, 17n-1w-31, sd 3998 ft. Strange Oil and Gas Co.'s Spicer 1, 17n-2w-11, dr 400 ft.

MECOSTA COUNTY — Jetter Oil Co.'s Parsley 1, 14n-10w-19, dr 900 ft. Jasmid Oil Co.'s Coopersville Bank 1, 13n-10w-22, sd 850 ft. Sherman Drilling Co.'s Scheibe 1, 15n-7w-13, dr 850 ft.

CLARE COUNTY—Sun Oil Co.'s Becker 1, 18n-3w-2, ur 1820 ft.

MONTCALM COUNTY — L. E. Duvall's Eiknorch 1, 11n-10w-13, sd 1343 ft. Fred Turner's McConke 1, 10n-5w-10, dr 1000 ft. T. F. Caldwell's Robins 1, 10n-5w-3, dr 750 ft; Ingersol 1, 10n-5w-14, dr 300 ft; Pugley 1, 10n-5w-36, sw se nw, lcn. Gordon Oil Co.'s Smith 1, 10n-5w-1, sg 970-90, dr 1300 ft; Frost 1, 10n-5w-3, dr 400 ft. McClanahan Oil Co.'s Flint 1, 10n-5w-11, dr 2000 ft. J. W. Leonard, Jr.'s West 1, 10n-5w, dr 2670 ft; West 2, 10n-5w-2, dr 800 ft; West 3, 10n-5w-11, lcn. Eastern Gulf's Barger 1, 10n-5w-2, dr 2800 ft; Florence 1, 10n-5w-2, lcn; Florence 2, 10n-5w-2, lcn; Curtis 1, 10n-5w-2, lcn; Beulah 1, 10n-5w-1, lcn; Barger 2, 10n-5w-2, lcn; Martha 1, 10n-5w-1, lcn; Fischer 1, 10n-5w-2, lcn; Race 1, 10n-5w-2, lcn; Race 2, 10n-5w-2, lcn; Hoover 1, 10n-5w-2, lcn. Daily Crude Oil Co.'s Tow 1, 10n-5w-2, dr 2400 ft. Rowmor Oil Co.'s Durbin 1, 10n-5w-2, dr 450 ft; Barger 1, 10n-5w-10, lcn; Ball 1, 10n-5w, se se se-2, br. Burnstein Oil Co.'s Keel 1, 11n-5w-35, dr 560 ft. C. R. Gallagher's Lindsay 1, 10n-5w-13, lcn. Taggart Bros.' Smith 1, 10n-5w-1, std 2810 ft; Smith 2, 10n-5w-1, rig. L. G. Thompson's Knapp 1, 12n-9w-17, dr 1800 ft. James M. Snowden's Wight 1, 10n-5w, ne ne ne, 10, dr 200 ft. J. E. Evans' Smith 1, 10n-5w-10, ru. Stork Oil Co.'s Dickinson 1, 10n-5w-3, sp. Michigan Crystal Petroleum Co.'s Evans 1, 10n-5w-ne ne ne-2, lcn. St. Louis Pipe & Supply Co.'s Osterhaut 1, 11n-5w, sw nw nw-36, ru; Clark 1, 10n-5w, se sw sw-9, mim. W. J. Bernier's Strait 1, 11n-5w, sw nw sw-35 rig.

GRATIOT COUNTY—Evans & Kelly's Pen-

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cak 1, 10n-4w-18, sg 970 ft, dr 1300 ft. T. F. Caldwell's Land Bank 1, 10n-4w-18, sp. John Melvin's Shaver 1, 10n-4w-4, dr 900 ft. Strange & Forney's Bovee 1, 10n-4w-7, dr 450 ft. McClanahan Oil Co.'s Akin 1, 10n-4w-17, dr 750 ft. Rex Oil Co.'s Biddle 1, 10n-4w-20, rig. Mammoth Petroleum Co.'s Graham 1, 11n-4w, dr 1600 ft. Newark Oil and Gas Co.'s Beck 1, 10n-3w-29, dr 750 ft. J. E. Evan's Yats 1, 10n-4w-nw, nw sw-6, ru.

MISCELLANEOUS

SAGINAW COUNTY—Chapin Oil Co.'s Sutlif 1, 9n-1e-16, sd 2926 ft. WEXFORD COUNTY—M. G. Ingold's Webb 1, 22n-9w-13, dr 1000 ft. OSCEOLA COUNTY—Smith Petroleum Co.'s Moster 1, 17n-10w-20, dr 500 ft. Russel & Johnson's Giese 1, 18n-10w-34, lcn. SHIAWASSE COUNTY—D. H. Dornell's Hardy 1, 6n-4e-7, sd 1820 ft. MACOMB COUNTY—H. H. Brown's Bower 1, 3n-14e-29, dr 1830 ft.

WYOMING

BIG HORN COUNTY—California Exploration Co.'s Gafner 1, sw sw 4-54n-94w, testing 900-50 ft. Wyoming Oil & Refining Co.'s Evans 1, ne ne nw 12-49n-91w, dr 215 ft.

CARBON COUNTY—Ohio Oil Co. and California Co.'s Kyle 1, ne se ne 26-21n-79w, cored 30 more feet of saturated Sundance sand and stopped in the second bench at 5391 feet. Well developed 165 bbls. per hour of 63 degree gravity oil on the drill stem between 5299-61 ft. Running 5 3/16-in csg and liner with liner set on top of second Sundance at 5299 ft. Perforations set opposite first sand which will produce gas, 5-in string. Packer set between benches. Earl W. Reader, Inc.'s Whitford 1, sw se se 24-20n-84w, dr 4350 ft.

CONVERSE COUNTY—Chadron-Osage Oil Trust's State 1, cne¼ 16-32n-79w, fsg for 15½-in csg 450 ft.

FREMONT COUNTY—Mid-American Oil Co.'s Government 2, cne sw 14-28n-92w, production increased from 100 bbls to 250 bbls. daily after treating with 1000 gals of acid in the Embar lime 2175-2211 ft.

WESTON COUNTY — Beaver Creek Oil Syndicate's State 1, ne ne 23-44n-63w, Beaver Creek, lcn.

MONTANA

FERGUS COUNTY — H. C. Rowland's Woodward 1, se se sw 20-14n-24e, dr 3050 ft.

LIBERTY COUNTY—J. H. Hamilton Syndicate's Northern Farms 1, cne sw 10-37n-5e, dr 2500 ft.

PHILLIPS COUNTY—Grant Smith et al's Phillips 4, e½ nw sw 2-24n-23e, dr 300 ft. Guy Norman's Pewitt 1, ne nw ne 20-24n-24e, dr 600 ft.

ROSEBUD COUNTY—Birney Oil & Gas Co.'s Fee 1, sw sw sw 6-6s-42e, dr at 300 ft.

TOOLE COUNTY—Frasier Cluth et al's Severance 1, cse ne 29-32n-2e, South Devon Dome, lcn.

COLORADO

BACA COUNTY—J. H. Everett et al's Test 1, nw nw nw 24-32s-48w, lcn.

PARK COUNTY — South Park Oil Co.'s State 1, se se sw 16-11s-17w, udr 10-in csg 1280 ft.

NEW MEXICO

BERNALLILO COUNTY—Norins Realty Co.'s Pajarito Grant 1, ne 29-9n-1e, lcn and dr 370 ft.

CHAVES COUNTY—Warman Oil Trust's Weldon-Hoar 1, nw se 9-14s-25e, Blackdom structure, co 20 ft off bottom at 1600 ft in the lime.

EDDY COUNTY—Dooley & Shank's McClay 1, cne se 33-18s-30e, rigging up machine. Getty Oil Co.'s Dooley 7, sw nw 24-20s-29e, Twin Hills structure, dr at 4370 ft in sand and shale. Stoval & Marshall's Rose 2, cne sw 28-24s-27e, Pecos River district, wocs after pb from 2374 ft where test had water to 2325-30 ft to test so.

GUADALUPE COUNTY—Anton Chico Development Co.'s Fee 2, nw ne sw 20-9n-17e, dr at 810 ft.

McKINLEY COUNTY—Bennett & Lingenfelter's Test 1, nw 29-20n-9w, showing for 20 bbl well at 900 ft.

OTERO COUNTY—Flynn, Welch & Yates' Donohue 1, cnw ne 28-24s-15e, Sacramento Creek structure, sd for repairs at 800 ft in black lime.

QUAY COUNTY—Quay County Dev. Co.'s Test 1, cse sw 19-9n-33e, dr at 450 ft.

SAN JUAN COUNTY—Kutz Canyon Oil & Gas Co.'s Day 1, sw sw 20-28n-10w, bailing samples of oil at 4340 ft.

SAN MIGUEL COUNTY—Cabra Springs Oil & Gas Co.'s Thompson 1, sw ne ne 22-12n-22e, udr and lowering 6⅝-in csg to bottom at 3865 ft and will carry it.

UNION COUNTY—Sierra Grande Oil Corporation's Rogers 1, cne sw 4-29n-29e, dr at 1470 ft, sg at 1225 ft in the red beds.

EDDY COUNTY—Geo. F. Getty Oil Co.'s Andrew Dooley 7, swc nw 24-20s-29e, 6000-ft test, elev 3309 ft, dr 4375 ft.

LEA COUNTY—Amerada Pet. Corp.'s State 1-F, c sw sw 36-19s-36e, Monument area, elev 3594 ft, top anhydrite 975 ft, salt 1220-2280 ft, so 3805-19 ft, td 3903 ft, set 2½-in tubing at 3893 ft to treat with 2000 gals. acid. Anderson-Prichard Oil Corp.'s Brett-Conoco 1, c se nw 7-20s-35e, Monument area, lcn; Fisher 1, c se ne 8-20s-35e, elev 3690 ft, top anhydrite 1945 ft, top salt 2000 ft, cem 7-in cas 2005 ft. Amon G. Carter et al's G. H. Mattix-Conoco 1, c se nw 3-24s-37e, elev 3258 ft, top anhydrite 1090 ft, top salt 1225 ft, top brown lime 2547 ft, dr 3030 ft. R. H. Henderson et al's P. J. Langley 1, c se se 8-25s-37e, elev 3162 ft, top salt 1205 ft, making gas, lost 2 strings tools, td 2875 ft, fsh whipstock at 2506 ft. Humble O&R Co.'s J. L. Coates 1, c nw ne 10-24s-36e, elev 3383 ft, salt 1314-2947 ft, top lime 2995 ft, gas killed, cem 7-in cas 3361 ft, td 3355 ft; J. L. Coates 1-A, relief well, elev 3385 ft, top anhydrite 1324 ft, top salt 1433 ft, pumping to kill offset, td 3394 ft. Jeffers Oil Co (R. H. Henderson's) C. M. Carlson-Conoco 1, c nw se 27-25s-37e, rust 196 ft; A. N. Etz-Conoco 1, c ne sw 12-21s-32e, cem 10¾-in cas 1120 ft; Jiminez-Conoco 1, c sw se 11-20s-33e, dr 620 ft. Maljamar O&G Corp.'s P. Miller 1, c nw sw 23-17s-32e, elev 3992 ft, top anhydrite 790 ft, top salt 955 ft, dr 3675 ft. Nat'l Securities Oil Corp.'s V. Linam 1, nec s½ sw 33-18s-37e, elev 3712 ft, top anhydrite 1580 ft, logged salt 1716-2650 ft, top lime 2956 ft, pb from sulphur water at 4506 to 4238 ft, treated with 3000 gals. acid. Ohio Oil Co.'s State-McDonald 3, c nw se 16-22s-36e, elev 3562 ft, top anhydrite 1450 ft, top brown lime 3060 ft, dr 3100 ft. Repollo Oil Co.'s B. W. Arnold 1, swc nw se 6-20s-32e, elev 3567 ft, top anhydrite 1540 ft, logged salt 1637-2695 ft, oil saturated lime 4295-4305 ft, used 3000 gals. acid at 4628 ft, tested dry, coring 4720 ft. Rowan-Drilling Co. & Neville G. Penrose's E. M. Elliott-Conoco 1, c ne sw 17-22s-37e, elev 3400 ft, top anhydrite 1070 ft, trace gas 3447 ft, dr 3725 ft. Shell's State 1-E, c se se 35-19s-36e, rig. Shell's State-Endura 1, c se ne 12-21s-35e, elev 3588 ft, top lime 3020 ft, pb from hfw 4404 to 3926 ft, flowing 10 bbls daily after shot and acid. Sun Oil Co.'s W. B. Maverly 1, c ne se 35-19s-36e, Monument area, lcn. Superior Oil Co. (Cal.'s) State 1, c ne ne 2-20s-36e, Monument area, rig. The Texas Co.'s Saunders 1, ce se sw 18-19s-37e, Monument area, dr 180 ft. W. L. Todd & The Texas Co.'s Fred Cole 1, c ne ne 35-19s-33e, elev 3603 ft, top salt 1540 ft, top white lime 3250 ft, sd in sulphur water 3513-18 ft, will deepen. Sam K. Vierson & Brown's W. D. Robinson 1, c nw se 14-11s-32e, elev 4355 ft, rig.

NEWS *from the* *Industry's* EQUIPMENT MAKERS

Atlas Supply Opens New Office at Kansas City

Atlas Supply Company has announced the opening of a Kansas division headquarters at 502 Union National Bank Building, Wichita, Kansas. Ed Robertson, for a number of years with the company at Muskogee, has been transferred to become office manager and R. A. Johnson continues as district manager. Atlas now has field stores at McPherson, Bushton and Russell.

Hamaker Named Director Of Reed Roller Bit

Rex Hamaker has been elected a director of Reed Roller Bit Company to fill the vacancy created by the death of Underwood Nazro. Hamaker has been with the company since 1928, and has been vice president in charge of sales for some time.

Due to expansion of activities in the Mid-Continent district, a number of salesmen have been added by Reed Roller Bit Company.

Oscar H. Crow, until recently store manager for Lucey Products Corporation at Hutchinson, Kansas, has been named salesman in the Oklahoma City field.

Charles H. Crow, a former drilling contractor, has joined the sales department and will devote his time to the Oklahoma City field.

Marvin McAnally, well known Mid-Continent drilling contractor, has been appointed salesman in the Oklahoma-Kansas territory.

Maintenance Engineering Appointed Scovill Distributor

The Scovill Manufacturing Company, Waterbury, Connecticut, announces the appointment of Maintenance Engineering Corporation, Houston, Texas, as its distributor for the Texas Gulf Coast territory. Maintenance Engineering Corporation expects to carry a stock of Admiralty tubing within the next few months so that shipments may be made immediately from stock.

Armstrong Bros. Tool Company Buys Ideal Chain Tongs Line

Armstrong Bros. Tool Company, Chicago, Illinois, recently has purchased the line of Ideal Chain Tongs from Carrier Engineering Corporation, Newark, New Jersey. The line has been purchased complete, including the name, inventory, etc., and Armstrong Bros. Tool Company now is carrying a complete line in stock and can make immediate delivery on orders.

Squeaks *from the* BULL WHEEL

Said the smart little waitress, slipping up beside the customer: "I've got deviled kidneys, calves' brains, pigs' feet, chicken livers and—"

"Forget it, sister!" growled the cranky diner, "I've got a headache, eczema, fallen arches, corns, a bunion, three warts and an empty stomach. Tell your troubles to some one else and bring me some ham and eggs."

Dogs, it appears, are carried free on English trains. A traveler, who was returning from Africa with a tortoise, wished to have the animal accommodated under the somewhat elastic rule as to dogs. But the Irish station master interpreted differently. "Dogs is dogs," he said, "and cats is dogs, and squirrels in cages is dogs, but that there animal is an insect, and must pay."

THOSE WHO ADVOCATE DIVERSION OF GASOLINE TAX FUNDS FOR OTHER THAN HIGHWAY PURPOSES SHOULD BE SENTENCED TO DRIVE THEIR OWN CARS OVER OUR ROUGHEST ROADS ONE WHOLE WEEK AT FORTY MILES PER HOUR.
By Crockett
ENROUTE

—Courtesy Powerene Company.

A little boy with a vivid imagination, presented the following essay on geese:

"Geese is a low heavy-set bird which is mostly meat and feathers. His head sits on one side and he sits on the other. Geese can't sing much on account of dampness of the moistures. He ain't got no between-his-toes and he's got a little balloon in his stommuk to keep from sinking. Some geese when they get big has curls on their tails and is called ganders. Ganders don't haff to sit and hatch, but just eat and loaf, and loaf and go swimmin'. If I was a geese I'd rather be a gander."

A pretty young nurse was selling poppies when a potential buyer, a young man, told her that he would give her a $5 bill for a poppy provided she would promise to nurse him if at any time he went to her hospital. She agreed.

"By the way," the young man asked, "where is your hospital?"

"I am at the Maternity Hospital," meekly replied the pretty nurse, putting the note into the box.

A gentleman upon being asked to have a drink replied, "No, I don't want a drink for three reasons: First, because I promised my mother not to drink; second, because my doctor told me not to drink; and third, because I just had a drink."

"When I said my prayers last night didn't you hear me ask God to make me a good boy?"

"Yes, Tommy, I did."

"Well! he ain't done it."

A motorist traveling a country road saw a house burning. Getting out of his car, he pounded on the door lustily, till an old woman opened it.

"Madam, your house is on fire!" he exclaimed.

"Eh?"

"I say your house is on fire!"

She put her hand to her ear and leaned toward him. "What?"

"Your house is burning up!" he roared.

"Oh! Is that all?"

"That's all I can think of just now, madam," he gasped.

A boy walked into the office of a telegraph company at Chicago and asked for a job. The manager happened to want a messenger boy just at that moment and gave him a message that had to be delivered in a hurry. "Here's your chance, my boy," said the manager. "These people have been kicking about undelivered messages. Don't come back until you've delivered it." A little while afterward the telephone rang. On the other end of the wire there appeared to be a building watchman, somewhat terrified.

"Did you send a messenger up here?"

"Yes."

"Well, he came over here and said he had to go to one of the offices. We don't allow no one up at that office at this hour and I told him he couldn't go up."

"Yes, yes."

"Well, he said he *would* go and I had to pull my gun on him."

"Good heavens, did you kill him?"

"No," came back the meek response, "but I want my gun back."

The *Shaffer Boomer* IS MORE THAN A LOAD BINDER

With the SHAFFER you exert tremendous pull—greater than in any other boomer—IT'S NOT NECESSARY TO USE A CHEATER—you can pull 2,000 pounds with the handle, and when load becomes loosened in transit it is only a matter of a few seconds—taking up a link or half a link. An absolute positive lock with handle in ANY POSITION. *Simplicity is the keynote of it's operation.*

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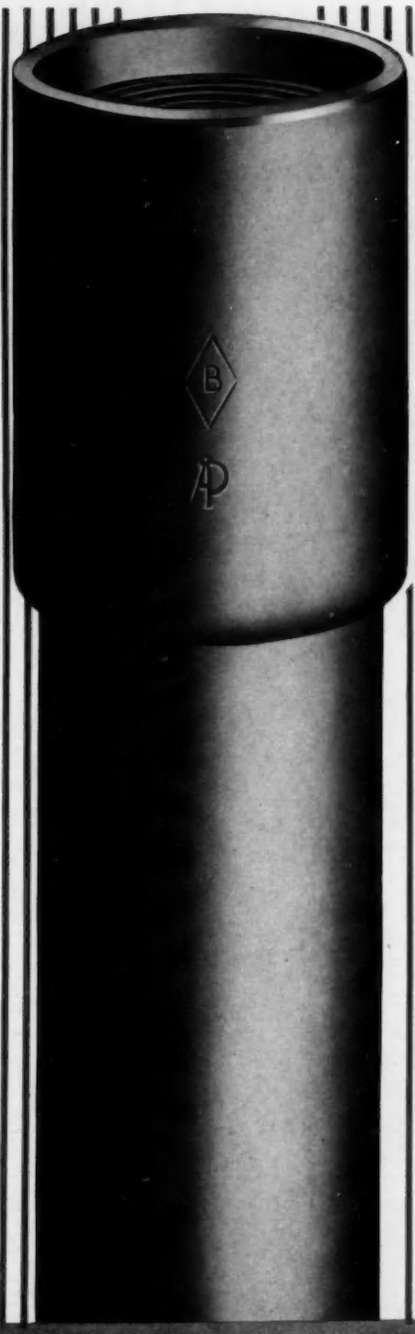

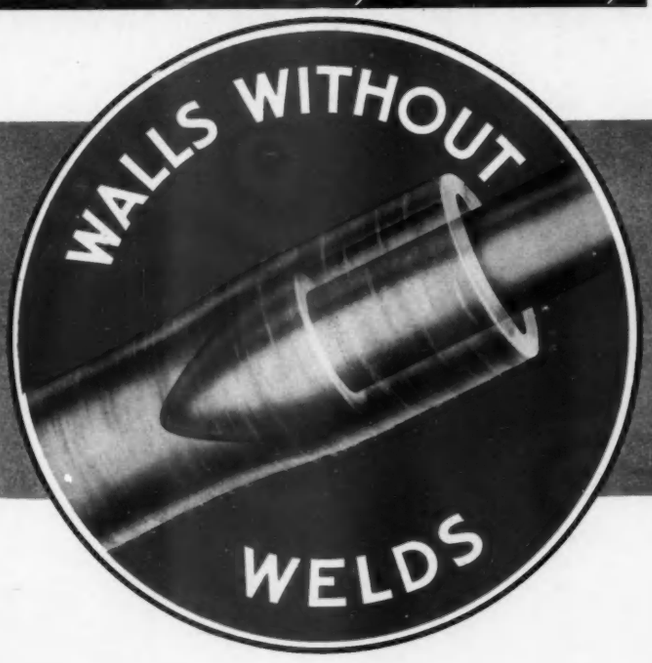

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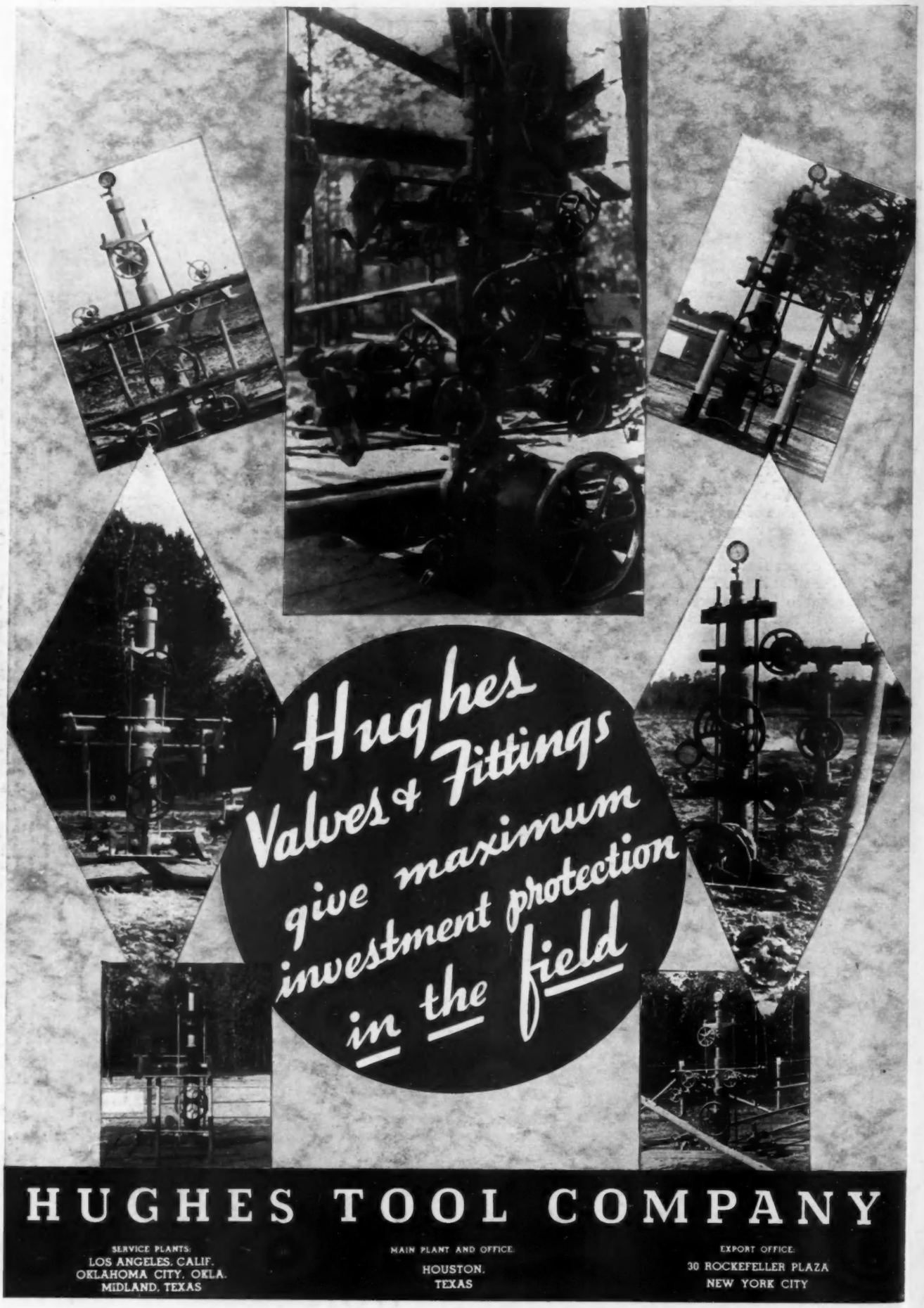

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